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A Study of the Invertebrates and Fishes of Salt Marshes in Two Oregon Estuaries

by

Duane L. Higley and Robert L. Holton

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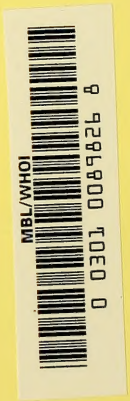

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This study examines the invertebrate and fish life in the estuarine tidal marshes of Siletz and Netarts Bays, Oregon. Sweep nets, corers, enclosures, and clip-quadrat samplers were used to collect both quantitative and nonquantitative samples of invertebrates in level marsh, pan, tidal creek, and tidal flat habitats located in seven study areas representing various types of marsh. Fish in these habitats, as well as in a slough and in bay channels, were sampled by seine and otter trawls. Community taxonomic composition and trophic structure,
(Continued)

along with fish stomach contents, are presented as relative frequency histograms and pie charts. Dominant invertebrate taxa in terrestrial collections were Acarina, Homoptera, and Diptera, and in aquatic collections were Capitellidae (polychaeta), Oligochaeta, *Gnorimosphaeroma* (Isopoda), and *Anisogammarus* and *Corophium* (Amphipoda). Three-spine stickleback and young staghorn sculpin were by far the most common fish species throughout the marsh zone; juvenile salmonids and other species were captured only in submerged level marshes and in a slough. Trophic structure of terrestrial and aquatic invertebrate communities was generally heavily weighted to detritivores and scavengers. The herbivore component increased from low marsh to high marsh and was the dominant trophic type in the higher vegetation (sweep net collections) of the high marsh. Araneae was the dominant invertebrate carnivore in the terrestrial communities. Fish consumed primarily aquatic animals, even those captured in tidal creek and submerged level marsh habitats where tidal inundation would be expected to make terrestrial foods available. The detritus food chain appears more important than the grazing food chain in the terrestrial communities, and transfer of marsh products to aquatic food chains apparently is predominantly through the export of detritus rather than by the direct consumption of terrestrial animals.

PREFACE

This report provides base-line and food-chain data on the invertebrate and fish fauna of several marsh habitats located in Siletz and Netarts Bays, Oregon. The study, sponsored by the U.S. Army Coastal Engineering Research Center (CERC) under CERC Contract No. DACW72-77-C-0013, evaluates the trophic value of Pacific coast salt marshes to provide information for assessing the impact of Corps of Engineers projects on these resources in the bay areas and in other marshland along the Oregon coast. Results and conclusions presented here are those of the authors and are not necessarily accepted by CERC or the Corps of Engineers.

The report was prepared by Duane L. Higley, Research Assistant, and Dr. Robert L. Holton, Assistant Professor of Oceanography, School of Oceanography, Oregon State University, Corvallis, Oregon, with the assistance of the following members of the staff of the School of Oceanography, Oregon State University: K. Chalopka, K. Jones, J. Morgan, J. Shaffer, and F. Stilwell. In addition, several students in the College Work Study Program worked on the project.

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R.M. Yancey and A.K. Hurme were the CERC contract monitors for the report, under the general supervision of E.J. Pullen, Chief, Coastal Ecology Branch, Research Division.

Comments on this publication are invited.

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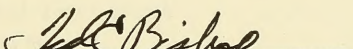

TED E. BISHOP
Colonel, Corps of Engineers
Commander and Director

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CONVERSION FACTORS, U.S. CUSTOMARY TO METRIC (SI) UNITS OF MEASUREMENT

U.S. customary units of measurement used in this report can be converted to metric (SI) units as follows:

Multiply	by	To obtain
inches	25.4	millimeters
	2.54	centimeters
square inches	6.452	square centimeters
cubic inches	16.39	cubic centimeters
feet	30.48	centimeters
	0.3048	meters
square feet	0.0929	square meters
cubic feet	0.0283	cubic meters
yards	0.9144	meters
square yards	0.836	square meters
cubic yards	0.7646	cubic meters
miles	1.6093	kilometers
square miles	259.0	hectares
knots	1.852	kilometers per hour
acres	0.4047	hectares
foot-pounds	1.3558	newton meters
millibars	1.0197×10^{-3}	kilograms per square centimeter
ounces	28.35	grams
pounds	453.6	grams
	0.4536	kilograms
ton, long	1.0160	metric tons
ton, short	0.9072	metric tons
degrees (angle)	0.01745	radians
Fahrenheit degrees	5/9	Celsius degrees or Kelvins[1]

[1]To obtain Celsius (C) temperature readings from Fahrenheit (F) readings, use formula: $C = (5/9)(F - 32)$.

To obtain Kelvin (K) readings, use formula: $K = (5/9)(F - 32) + 273.15$.

A STUDY OF THE INVERTEBRATES AND FISHES OF SALT MARSHES IN TWO OREGON ESTUARIES

by
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I. INTRODUCTION

North American salt marsh ecosystems have been intensively studied because of their high productivity and relatively simple structure. However this attention has been mainly directed to the Atlantic coast marshes. Prior studies have investigated community structure and population energy flow (Odum and Smalley, 1959; Teal, 1962; Nixon and Oviatt, 1973), nutrient pathways using radionuclide tracers (Marples, 1966), and faunal distribution (Barnes, 1953; Davis and Gray, 1966). Studies centered in the Chesapeake Bay region, the Carolina coast, Sapelo Island (Georgia), and Barataria Bay (Louisiana) have produced the following information on salt marsh characteristics: (a) Primary productivity is high (about 445 to 2,883 grams dry weight per square meter per year), comparable to the most fertile natural and agricultural systems; (b) little of the marsh production is grazed (<10 percent), most ending up in detritus food webs of the estuary; and c) the nutritional content of detrital particles consumed is enhanced by adhering decomposer organisms (summarized by de la Cruz, 1973). Because of the major importance of detritus food chains in marsh and other estuarine habitats, recent work has emphasized determining the rates and outputs of marsh detritus (Reimold, et al., 1975), and the structure of the dependent heterotrophic food chains (Odum and Heald, 1975).

Floral composition and zonation of salt marshes on the Pacific coast have been documented (MacDonald, 1977). The major study of Oregon salt marsh vegetation is by Jefferson (1974), who characterized and mapped essentially all Oregon's coastal marshes except those in the Columbia River. Her descriptions of species composition and community structure, succession, and distribution apply to Washington marshes (MacDonald, 1977). Further description of marsh composition and zonation is provided by Frenkel, Boss, and Schuller (1978). They studied the transition zone between intertidal marshes and contiguous upland vegetation in Oregon and Washington.

Eilers (1979) conducted an intensive study of the salt marshes of Nehalem Bay, Oregon. He determined plant associations and zonation relations, and measured primary production and detrital output. Net primary production varied between 518 and 1,936 grams per square meter per year. An excess of 90 percent of the intertidal net production was transported into the estuary as detritus.

The Environmental Protection Agency (EPA) is currently studying salt marsh plant productivity in Siletz and Netarts Bays, Oregon. The EPA study is part of a larger program concerned with defining wetland boundaries, the reactions of wetlands to perturbation, and the effects of wetlands on water quality (H. Kibby, Corvallis Environmental Research Laboratory, EPA, Corvallis, Oregon, personal communication, 1979).

Information on the structure and ecology of the animal communities of Pacific coast salt marshes is incomplete. MacDonald (1969) studied the local, seasonal, and latitudinal variations in molluskan fauna in level marsh and tidal creek habitats along the Pacific coast from Baja, California, to Washington. He found *Assiminea translucens*, a small prosobranch, to be ubiquitous in level marshes of this region, with *Littorina newcombiana* (Prosobranchia) and *Phytia myosotis* (Pulmonata) joining *Assiminea* to form a characteristic Oregonian assemblage. Tidal creek mollusks were mostly bivalves, a *Macoma-Mya* assemblage characterizing the Oregonian Province. The number of species recorded from each habitat increased from north to south. Level marsh mollusks fed predominantly on algae or plant detritus by rasping; tidal creek forms included deposit and suspension feeders as well as predators and scavengers.

Whitlatch (1974) observed the growth, production, and seasonal abundance patterns of *Batillaria zonalis*, a small introduced prosobranch, in pans, tidal creeks, mudflats, and *Salicornia* level marshes of Tomales Bay, California. Abundance was greatest in pans and creeks, but recruitment was lacking in the creeks which apparently resulted in the relative stability of the populations there. Influx was likely due to immigration from the pans where recruitment was successful.

Two studies have been made of insect populations of San Francisco Bay marshes. Using a sweep net for collecting, Lane (1969) identified 124 species in *Spartina-Salicornia* marshes. The majority of species were in the orders Diptera (flies) and Homoptera (planthoppers); Delphacidae (Homoptera), and Chloropidae, Ephydridae, and Chironomidae (all Diptera) were the dominant families. Cameron (1972) used a clip-quadrat method in a similar marsh to study insect trophic diversity and its relation to resource availability (living and dead plant materials). He found that herbivore diversity increased with primary production, and that saprovore diversity increased during periods of detrital input. In general, trophic diversity showed seasonal patterns relating to physical factors and (more clearly) to resource availability. Cameron hypothesized that seasonal increases in diversity occurred as seasonal species joined persistent species in exploiting expanding resources.

The only major study of trophic relations in a Pacific coast salt marsh ecosystem is the Coos Bay, Oregon, study sponsored by the National Science Foundation (Hoffnagle, et al., 1976). Short-term field and laboratory studies were used to measure net primary production, detrital production, decomposition rate, nutrition of key species, and the composition of insect and fish populations of several marsh sites.

In recent years, interest has increased in the role of estuarine food chains in the growth and survival of seaward-migrating juvenile salmonids along the Pacific Northwest coast. There is evidence that those juveniles which benefit from favorable estuarine conditions have a better chance at sea (e.g., Reimers, 1971). These fish seem to adjust their habitat and feeding strategies to exploit freshwater and marine as well as estuarine food chains while making the transition to marine life (Mason, 1974). The fish are found in some marsh habitats, especially tidal creeks. Dunford (1975) found juvenile chum salmon (*Oncorhynchus keta*) and chinook salmon (*O. tshawytscha*) residing in sloughs and creeks of the Fraser River estuary

marshlands (British Columbia) in the spring and summer. The salmon consumed a variety of terrestrial, planktonic, and benthic foods. Dunford identified 13 other fish species in these habitats.

Junvenile salmonids in nonmarsh habitats may exploit marsh-based food chains. In the Squamish River estuary (British Columbia), Cliff and Stockner (1973) discovered heavy feeding by salmon on amphipods (principally *Anisogammarus* spp.) which are largely marsh-dependent. Juvenile chum salmon in the Nanaimo estuary (British Columbia) heavily exploit harpacticoid copepods and thus have a food chain that depends on detritus from the marshlands (Healey, 1979).

Although past studies of Pacific coast salt marshes have been limited, the data collected suggest similarities of structure and function between these marshes and the Atlantic coast marshes; e.g., levels of primary production, contribution to detritus-based food chains, and some aspects of community composition. Important questions remain regarding the value of Pacific coast marsh habitats and food chains for various fish species, especially juveniles. The trophic structure and function of these marshes should be determined, especially to evaluate the human use of marshlands.

This study characterizes the animal communities and food chains of marshes in Siletz and Netarts Bays, Oregon. The objectives were to develop taxonomic lists, to characterize the trophic structure of marsh invertebrate communities, and to identify the principal fish species using the marsh and marsh-related habitats. In addition, food habits of these fish were studied to determine marsh food-chain relations.

II. DESCRIPTION OF STUDY AREAS

1. General.

Salt marshes of the Pacific Northwest are of recent origin and, in comparison to the Atlantic marshes, are limited in size and distribution. The steep and rocky coastlines of Washington, Oregon, and California restrict suitable marsh habitats to a few bays, estuaries, and lagoons. These marshes generally lack the thick peat layers which reflect long-term accretion (MacDonald, 1969).

In Oregon, interglacial deposits filled river mouths, and post-Pleistocene drowning produced extensive tidelands in the northern and central bays. More rapid sediment deposition in the southern bays matched rises in sea level and thus restricted tideland development. All the 27 estuaries in Oregon are presently accumulating sediment. Fires in the mid-19th century and the Tillamook fire in 1933, augmented by logging and other detrimental land-use practices, have increased the erosional sources of bay deposits (Jefferson, 1974).

The climate of the Oregon coast is wet-temperate. Annual precipitation averages about 180 centimeters and temperature about 10° Celsius. The frost-free season lasts 250 to 300 days, and freezing weather is infrequent. Pacific winter storms accompanied by gale-force winds are common, but generally lack the destructive force of tropical and convective storms common to the Atlantic coast. Winter freshets in coastal rivers

and the diluting effects of the Columbia River discharge may substantially reduce estuarine salinities. In light of this, Kistritz (1978) suggests that the term "salt marsh" may often be inappropriate in describing tidal marshes of the Pacific Northwest.

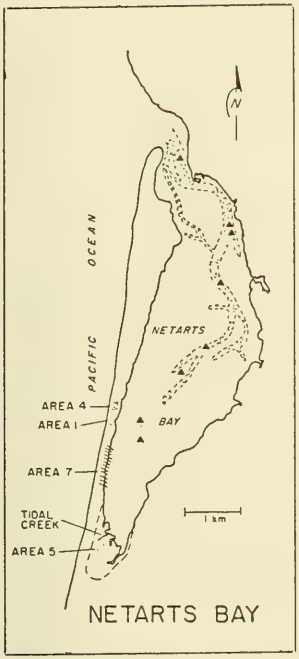
Mixed diurnal tidal fluctuations result in abrupt changes of immersion and exposure times at about 2.7 meters or mean higher high water (MHHW), where mean lower low water (MLLW) is the zero datum. Below MHHW a distinctive salt marsh vegetation characterized by pickleweed (*Salicornia virginica*), commonly known as "low marsh," extends down to about mean lower high water (MLHW). Above MHHW, a "high marsh," characterized by tufted hair grass (*Deschampsia caespitosa*), grades into terrestrial vegetation at about extreme high water (EHW). Jefferson (1974) lists six vegetation types for Oregon saline-brackish intertidal marshes: (a) low sand marsh, (b) low silt marsh, (c) sedge marsh, (d) immature high marsh, (e) mature high marsh, and (f) bulrush and sedge marsh. One to seven vegetative communities may occur within each vegetation type. These communities and marshes form complex and somewhat variable relations with each other and with tidal level which Jefferson treats as successional. Three successional patterns occur, depending on substrate (sand versus silt) and freshwater influence. Lyngbye's sedge (*Carex lyngbyei*) is intermediate in all three patterns, widely distributed, and considered by Jefferson to typify Oregon salt marshes.

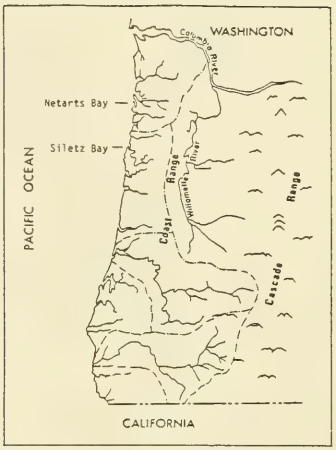
Low marshes typically advance through coalescing colonies of seaside arrowgrass (*Triglochin maritima*) or rhizomous mats of pickleweed. The lower edges of the marsh are also commonly lined with three-square bulrush (*Scirpus americanus*). Transitions from low to high marsh may be gradual or abrupt across an eroded bank. Tidal flat to high marsh eroded banks may be 1 meter high. Extensive diking, landfills, and other man-induced effects have significantly changed the marshlands. Jefferson (1974) states that undiked old, high marsh is nearly nonexistent in Oregon.

2. Siletz and Netarts Bays.

Siletz Bay, a spit-protected estuary of about 4.8 square kilometers, is located on the central Oregon coast (Fig. 1). The bay receives runoff from the Siletz River and two creeks. The average winter and summer Siletz River discharge is 45 and 6 cubic meters per second, respectively. Logging has caused extensive sedimentation, and diking, roadbuilding, and filling projects have restricted flushing, causing tidelands to increase; therefore, the marshes are expanding. Salinity varies widely according to discharge and tide stage. During winter freshets, the salinity of surface waters is often less than 5 parts per thousand where the Siletz River enters the bay; summer surface salinities exceed 20 parts per thousand (Rauw, 1975). Temperatures generally vary from 7° to 15° Celsius (Rauw, 1975), but may exceed 18° Celsius in some habitats (Table 1).

Netarts Bay, a shallow, bar-built estuary of about 10.4 square kilometers, is located on the north-central Oregon coast (Fig. 1). The bay has a very small watershed, which drains through 13 small creeks, and is therefore usually completely mixed and marine-dominated. Salinities usually exceed 25 parts per thousand. Bay temperatures generally reflect ocean temperatures (about 8° to 15° Celsius); however, temperatures greater





STUDY AREAS

1 Low sand marsh

2 Low silt marsh

3 Sedge marsh

4 Immature high marsh

5 Mature high marsh

6 Netarts open bay otter trawl sites (indicated by ▲)

7 Netarts low sand marsh seine site

8 Siletz low sand marsh seine site

9 Siletz open bay otter trawl sites (indicated by ▲)

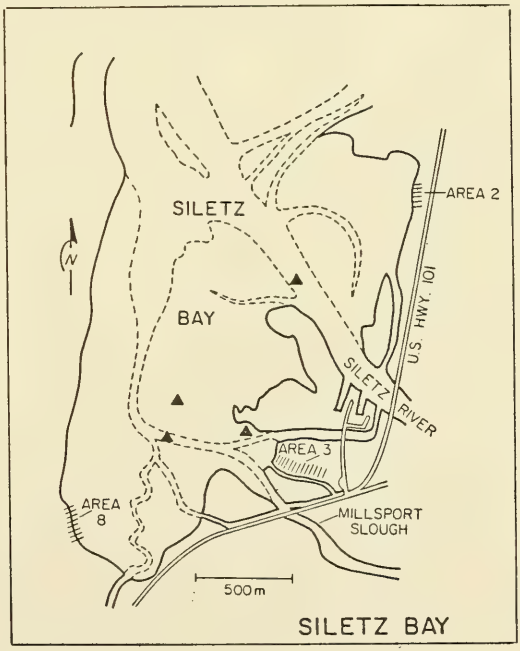


Figure 1. Location of study areas in Netarts and Siletz Bays.

Table 1. Salinity and temperature readings.

Area	Habitat	Date	Salinity (°/₀₀)	Temperature (°C)
		Netarts Bay		
1	Level marsh	18 Jan. 78	--	9.0
1	Level marsh	7 Feb. 78	26	9.8
4	Tidal flat	7 Apr. 78	29	17.0
4	Large pan	7 Apr. 78	12	--
1	Level marsh	7 Apr. 78	29	--
6	Bay channel	3 June 78	31	--
1	Level marsh	22 July 78	36	27.0
1	Level marsh	17 Oct. 78	33	20.0
5	Tidal creek	17 Oct. 78	33	20.0
5	Marsh channel	1 Nov. 78	18-30	7.0-11.8
5	Pan	1 Nov. 78	13	--
7	Tidal flat	29 Aug. 78	33	21.0
5	Tidal creek	12 Apr. 79	15	11.0
5	Pan	12 Apr. 79	19	11.0
7	Tidal flat	12 Apr. 79	28	11.0
		Siletz Bay		
3	Level marsh	18 Jan. 78	--	9.5
3	Level marsh	6 Feb. 78	28	10.5
3	Level marsh	6 Apr. 78	9	12.5
2	Level marsh	6 Apr. 78	9	12.5
3	Slough	24 June 78	21	--
3	Tidal creek	21 July 78	26	28.0
2	Level marsh	21 July 78	30	25.0
3	Tidal creek	21 July 78	26	23.0
9	Tidal flat	18 Sept. 78	18-20	18.0
3	Level marsh	16 Oct. 78	25	15.5
2	Level marsh	16 Oct. 78	23	16.0
3	Tidal creek	26 Apr. 79	18	17.0
8	Level marsh	26 Apr. 79	27	14.0
3	Pan	26 Apr. 79	15	18.0

than 26° Celsius may occur in the summer over tidal flats and marshlands (Table 1). Logging on the watershed from 1951 to 1971 caused extensive siltation in the bay, but sediment input now is apparently low and stable (Kreag, 1979).

High and low marshes fringe the inner shore of the spit, and a large area of high marsh occupies the southern end of the bay. This marsh was once diked and used for pasture; however, the marsh has since reverted to nearly natural drainage patterns under State ownership.

3. Bay Study Areas.

Nine study areas were established in the two estuaries (Fig. 1). Areas 1 to 5 were chosen to represent the specific vegetation types listed by Jefferson (1974), and were sampled most thoroughly. Substrate characteristics of the marsh soil in these areas are given in Table 2. The other areas are open bay and low marsh habitats, sampled once for fish. Elevation data for areas 1, 3, and 4 are based on nearby EPA study sites (H. Kibby, personal communication, 1979).

a. Area 1, Low Sand Marsh (Netarts Spit). This sandy beach (Table 2) supports a mixed cover of pickleweed and saltgrass (*Distichlis spicata*). The lower edge of the marsh is lined with three-square bulrush. Invertebrate samples were taken in the pickleweed-saltgrass zone (about 2.4 meters above MLLW), and fish samples in the three-square bulrush zone and the adjacent tidal flat (≤2.1 meters above MLLW). A debris line of dead eelgrass (*Zostera marina*) frequently forms at varying levels along this marsh.

b. Area 2, Low Silt Marsh (North of Siletz River). This is an area of prograding low marsh along Highway 101. The substrate in the marsh and the adjoining tidal flat is mud (Table 2). The lower edge of the marsh is composed of interrupted colonies of seaside arrowgrass invaded by Lyngbye's sedge, which is the dominant species at higher elevations. Aquatic invertebrate samples were taken in this transition zone which is characterized by frequent flooding, pools of standing water among the plants, and dense populations of amphipods and isopods. Terrestrial invertebrate samples were collected higher in the sedge stand. Fish samples were collected about 100 meters south of these sites in a series of small tidal creeks that extend from high marsh through the sedge community and through the bulrush community at the edge of the marsh.

c. Area 3, Sedge Marsh (South of the Siletz River). This marsh has muddy soil (Table 2) with vegetation dominated by sedge, but floods less frequently than the low silt sedge marsh. Elevation in the region of level marsh invertebrate sampling site is about 2.3 meters above MLLW. A dendritic system of small tidal creeks laces the marsh and apparently receives some seepage through earthen dikes. A major creek (maximum 10 meters wide, 0.7 meter deep) dissects the marsh in an east-west direction. The channel is deep at both marsh edges and shallow at the marsh center. Therefore marsh drainage water in the channel flows in both directions away from the center. Fish and aquatic invertebrate samples were taken in various creek, pan, and tidal flat habitats, as well as in Millport Slough which borders the marsh on the southwest. All these habitats have muddy substrates.

Table 2. Substrate characteristics of marsh soil at level marsh sampling sites.[1]

River Marsh	Netarts Low sand (area 1)	Siletz Low silt (area 2)	Siletz Sedge (area 3)	Netarts Immature high (area 4)	Netarts Mature high (area 5)
Debris	3.3%	10.1%	15.6%	66.1%	23.0%
Sediment	96.7%	89.9%	84.4%	33.9%	77.0%
Sand	92.5%	12.8%	1.1%	67.8%	87.0%
Mud	7.5%	87.2%	98.9%	32.2%	13.0%
Sediment Size Class (mm)					
>1.00	0.0%	0.2%	0.2%	0.0%	0.0%
0.500-1.00	0.0%	0.3%	0.3%	0.1%	0.0%
0.250-0.500	71.8%	3.2%	0.3%	2.7%	5.6%
0.125-0.250	19.5%	2.3%	0.3%	57.6%	80.6%
0.063-0.125	1.2%	7.0%	0.1%	7.4%	0.8%
< 0.063	7.5%	87.2%	98.9%	32.2%	13.0%

[1]Sample cores were processed in the following manner: (a) The whole sample was wet-sieved on a 2-millimeter screen (>2 mm = debris, <2 mm = sediment); (b) the sediment fraction was wet-sieved on a 0.063-millimeter screen (>0.063 mm = sand, <0.063 mm = mud); (c) the sand fraction was dry-sieved on 1.0-, 0.5-, 0.25-, and 0.125-millimeter screens; and (d) all fractions were dry-weighed. The debris fractions included roots, shells, and similar materials.

d. Area 4, Immature High Marsh (Netarts Spit). This marsh, located slightly north of the low sand marsh, has an elevation of about 3.2 meters above MLLW and is bordered by an eroded bank. The dominant vegetation is tufted hairgrass and Pacific silverweed (*Potentilla pacifica*). The soil is peaty with an underlayer of fine sand (Table 2). A large pan (40 by 10 meters) retains tidal and runoff water during the winter and spring but dries up by midsummer.

e. Area 5, High Marsh (South End of Netarts Bay). A branch of Jackson Creek, which flows directly into the ocean, flows through this 40-hectare marsh. The marsh is dissected by numerous deep tidal creeks with several openings into the bay. These creeks and the northern edge of the marsh have steep eroded banks. The marsh soil is peaty with a sand underlayer. The creek bottom and adjoining tidal flats vary from brown sandy mud to black mud. Marsh vegetation is primarily tufted hairgrass but the composition varies; some areas are dominated by Pacific silverweed, pickleweed, rush, and other plants. The creeks are often clogged with rotting eelgrass. Several pans are scattered throughout the marsh. Those connected to creeks retain water, while others tend to dry out in midsummer.

f. Area 6, Netarts Open Bay. This designates the bay channel and tidal flat regions in which otter trawls were used to obtain estuarine fish samples. The channels are mostly shallow, many of them having eelgrass beds.

g. Area 7, Low Sand Marsh Seine Site (Netarts Bay). This 1-kilometer section of low sand marsh, located immediately south of area 1, is a narrow strip (about 3 to 20 meters wide) that is mostly vegetated by pickleweed. Plant cover is variable, and the shoreline is irregular due to erosion.

h. Area 8, Low Sand Marsh Seine Site (Siletz Bay). This 0.4-kilometer strip of low marsh, located on the southeast edge of the Siletz spit, has high marsh along eroded banks.

i. Area 9, Siletz Open Bay. This designates tidal flats and channels which were sampled for estuarine fish using an otter trawl.

Selection of the study areas was partly based on EPA use of areas 1, 3, and 4 for their productivity studies. The intent was to establish site-specific data on the animal communities of marshes where the EPA studies were being conducted. The EPA work focused on determining primary productivity and decomposition rates for selected, nearly monospecific vegetation types (pure stands) and determining the availability of marsh production to detritus-based food chains. The results of this work are currently being compiled (H. Kibby, personal communication, 1979). Initial conclusions are that primary productivity rates range from about 500 to 1,800 grams per square meter per year, with Lyngbeye's sedge having the highest productivity. Biomass of this sedge peaks in June-July at about 1,200 grams per square meter per year. Seaside arrowgrass apparently decomposes more rapidly than other species studied, and is the only species which showed evidence of grazing (probably by deer).

The marshlands provide a variety of habitats and subhabitats whose properties change daily with tidal and seasonal conditions. Animal populations respond with zonations and marked fluctuations which reflect life cycles, tidal exchange, and migrations to escape inundation. In this study, it was impossible to fully characterize these fluctuating populations over the variety of marshes and habitats studied. The approach was to sample the major habitat types in the marsh ecosystem (Fig. 2), and to collect comparative samples from other estuarine habitats such as tidal flats and bay channels. Extensive sampling was conducted in level marshes, the most widely distributed, and tidal creeks, the most likely contributors to aquatic food chains of the marsh habitats.

III. METHODS

1. General.

The basic objective of this research was to characterize the invertebrate and fish life of the Siletz Bay and Netarts Bay marshes. Sampling, which varied with weather and tidal conditions, was conducted at approximately 2-month intervals. The greatest sampling effort was made in the spring and summer. Most collections were either one-time surveys or repeated surveys as opportunities arose. The only habitat for which seasonal data were collected was the submerged marshes (invertebrate fauna). On some occasions, two work crews were used to exploit a brief sampling time frame (e.g., a single high tide). Table 3 lists the various sampling devices and their uses. Appendix A provides suggestions for gear improvement.

2. Invertebrate Studies.

Aquatic invertebrate samples from level marsh, pan, tidal creek, and adjacent tidal flat habitats were routinely processed and preserved in the field using a 5- to 10-percent buffered seawater formalin solution. Occasionally, it was necessary to process samples in the laboratory after storage in an ice chest for a day. Such treatment had no observable effect on the stored animals. Except for terrestrial and certain core samples, all samples were sieved on 0.5-millimeter screens or were obtained with 0.5-millimeter-mesh nets.

After several days storage in formalin solution, the samples were transferred to a 70-percent isopropanol solution and stained with rose bengal or a similar stain to enhance visibility of the animals during sorting. Samples were sorted, under a 3-diopter illuminated lens, to broad taxonomic groups, and later identified. Usually, crustaceans, polychaetes, and bivalves were identified to genus or species, insects to family, and other groups to higher taxa (order, class, etc.). When appropriate, life stage (e.g., adult, larva, pupa) was recorded. Invertebrate classification follows Barnes (1974) and Borror, DeLong, and Triplehorn (1976).

The aquatic samples varied widely in quantity of debris and number of animals collected. To facilitate processing, the samples were separated by stacked sieves into two size groups (0.5 to 2 millimeters and >2 millimeters) or split quantitatively with a Folsom plankton splitter. This

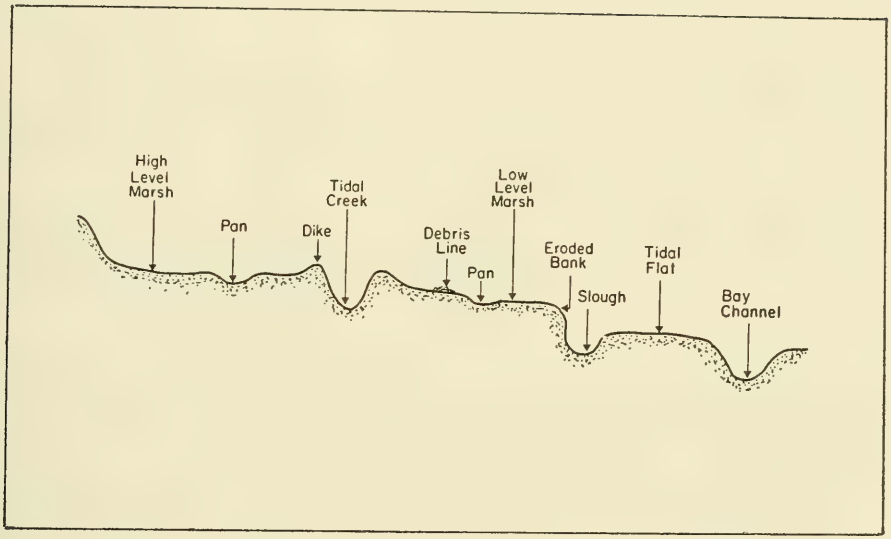


Figure 2. Habitats of the salt marsh ecosystem (adapted from Ranwell, 1972).

Table 3. Description of sampling gear and methods.

Device	Description	Use
Small corer	5.1-cm-diameter tube with handles	Quantitative infauna sampling; also sediment sampling
Medium corer	10.2-cm-diameter tube with handles	Quantitative infauna sampling
Large corer	15.2-cm-diameter tube with handles	Quantitative infauna sampling
Small enclosure	27-cm-diameter by 30-cm-high plastic cyliner	Quantitative sampling of invertebrates of strand line
Large enclosure	1-m-diameter by 1-m-high canvas cylinder with lead-line and floats	Quantitative sampling of invertebrates in submerged level marsh
Aquatic sweep net	0.5-mm-mesh nitex	Quantitative (with large enclosure) and nonquantitative sampling of submerged invertebrates
Terrestrial sweep net	Fine mesh muslin	Semiquantitative sampling of invertebrates on exposed vegetation
Small drift net	0.5-mm-mesh nitex net on 12.5-cm-diameter frame	Nonquantitative sampling of drift organisms in small tidal creeks
Large drift net	0.5-mm-mesh nitex net on 25- by 50-cm frame	Nonquantitative sampling of drift organisms in large tidal creeks
Clip quadrat	25- by 25-cm wooden frame within which plant material was clipped loose from the soil	Quantitative sampling of invertebrates on exposed level marsh
3-m seine	Common-sense seine with 0.6-cm mesh	Fish collection in small tidal creeks and pans
15-m seine	1.3-cm-mesh body and 0.6-cm-mesh bag	Fish collection in large tidal creeks and over low (level) marshes
52-m seine	2.5-cm-mesh body and 1.3-cm-mesh bag	Fish collection over low marshes and adjacent tidal flats and sloughs
Otter trawl	5-m trawl with 3.2-cm-mesh body and 0.6-cm-mesh cod end	Fish collection in bay channels and mudflats

process was especially useful for samples collected with the large enclosure in the fall when detached vegetation was present.

a. Level Marsh. The principal method for collecting submerged invertebrates in the level marshes was the large enclosure (Table 3). It was dropped over a preselected sample point and secured at the soil by standing on the leadline, which closely conformed to the soil contours. The 0.5-millimeter-mesh aquatic sweep net was then repeatedly swept within the enclosure until capture rates were very low or zero. The animals and debris were concentrated and preserved. This method provides a semiquantitative measure of the aquatic and terrestrial animals found near or in submerged vegetation, although in a few cases it was difficult to remove all of the highly abundant isopods found in the low silt marsh (Siletz Bay) study site.

Large enclosure studies were designed primarily for the low marshes although a single sample set was collected in the immature high marsh during an extremely high winter tide. Samples from the low marshes were collected on three to four occasions.

Large enclosure sample sites were established where a stand of selected type of vegetation occurred in a reasonably accessible location. Each site was a 10- by 10-meter grid divided into 100 sampling areas. On each sampling day, four randomly preselected areas were sampled. Each area was sampled only once during the study.

A similar sampling plan was established to study the infauna of level marshes. A plug of soil and roots 10.2 centimeters in diameter and up to 25 centimeters deep was removed at selected sampling areas in a grid (separate from but near the large enclosure grid). The plug was disaggregated by hand under water and then sieved on a 0.5-millimeter screen. Early results showed that the majority of the animals were near the surface, so later samples were only 5 to 10 centimeters deep. It was also decided that the few animals collected and the relative unlikelihood of their directly entering aquatic food chains did not warrant the time and effort required for extensive sampling. Therefore, only one set of four samples per marsh was collected and completely processed.

Sampling of terrestrial invertebrates of the level marsh was conducted during low tides with the terrestrial sweep nets, clip-quadrat method, and small enclosure (Table 3). One set of samples was taken at each marsh. Collections were planned during the warmest and driest period of the year, but an unusually wet season forced the postponement of several collecting trips. The collections were finally accomplished during favorable tides and weather on 29 August 1978 (low sand and immature high marshes of Netarts Bay), of September 1978 (low silt and sedge marshes of Siletz Bay), and 25 September 1978 (mature high marsh of Netarts Bay). On these dates, the air temperature was 19° to 24° Celsius, the wind 0 to 16 kilometers per hour, and the sky sunny to overcast.

All samples were taken at low tide. The wind was minimal, the air temperatures were moderate, and the marsh vegetation was slightly damp. Within each level marsh type, sample sites met the following criteria: (1) selected vegetation community, (2) uniform vegetational cover, (3)

level ground, (4) easy accessibility, and (5) no evidence of recent disturbance. A 10- by 10-meter grid at each site was measured and marked off by corner stakes.

The terrestrial sweep net sampling method (Table 3) was adapted from Davis and Gray (1966). The net was vigorously swept back and forth across the upper parts of the vegetation through an horizontal arc of about 1 meter. Following each sweep, one step was taken and the direction of the net was reversed. Four samples, each consisting of 20 strokes (10 in each direction), were obtained, one along each edge of the perimeter of the grid.

After each sample, the contents of the net were placed in a large ethyl acetate-charged killing jar and later transferred to a wide-mouth specimen jar. The samples were cooled in an ice chest for processing in the laboratory where they were then stored in a cold room until the damp and sometimes succulent plant debris could be removed. The insects were sorted and stored dry except for soft-bodied species which were preserved in 70-percent isopropanol solution.

At each marsh grid, four randomly preselected points were sampled by the clip-quadrat method (Table 3). The vegetation was first clipped off 15 centimeters above the ground. The remaining vegetation was then sliced off at the ground level with a sharp knife and placed in a heavy plastic bag along with any plant litter that could be gathered at the base of the plant. Roots were not collected. Insects seen crawling on the ground inside the quadrat frame were also deposited in the bag. The bags were inflated and securely fastened to avoid crushing the collected plants and insects. The inflated bags were packed in an ice chest for transport to the laboratory. In the laboratory, the plant material was processed in a Berlese-Tullgren apparatus for 7 days. The insects were preserved in small specimen jars filled with 70-percent isopropanol solution.

b. Debris Line. Invertebrate life of a 40- by 1-meter (approximate) debris line in the low sand marsh was sampled using the small enclosure method (Table 3). Four randomly chosen areas in the line were sampled by pushing the small enclosure through the debris (principally eelgrass) and removing the enclosed plants and invertebrates. The samples were processed in the same manner as the clip-quadrat samples.

All the terrestrial samples were sorted in a flat container under a binocular dissecting scope. Terrestrial sweep net samples, which often contained considerable plant debris, were sorted in a white enamel pan. Samples processed in the Berlese-Tullgren apparatus were sorted in a petri dish. Larvae and the animals less than 0.5 millimeter were not included in the data.

c. Pan. Several samples were taken in pans in immature and mature high marsh using the aquatic sweep net method (Table 3). Some laboratory observations of living animals were also made.

d. Tidal Creeks. Tidal creeks were sampled using small corer, large corer, and aquatic sweep net methods along transects in the mature high marsh in Netarts Bay (1 November 1978) and sedge marsh in Siletz Bay

(24 June 1978). In each bay, the creeks were sampled at equal intervals as measured along the curves of the creeks, using the small corer (four samples per station), the large corer (one sample per station), and the aquatic sweep net (one sample per station). The small corer samples were 10 centimeters deep and captured small surface crustaceans and worms. Large corer samples penetrated 30 centimeters to sample larger and deeper dwelling species such as bivalves. Small corer samples were screened on a 0.5-millimeter sieve and the large corer samples on a 2-millimeter sieve.

The mature high marsh transect was 480 meters long and included five stations spaced at 120-meter intervals. Station 1 was located at the creek mouth, where the bottom is 28 meters wide and 0.8 meter below the level marsh. Stations 1, 2, and 3 were located below a dike, and stations 4 and 5 above the dike in a tributary creek. The creek at station 5 was 1.1 meter deep and 0.7 meter wide. Aquatic sweep net samples were taken only at stations 1, 2, and 4.

The sedge transect was 400 meters long with eight stations spaced at 50-meter intervals. The creek bisects the sedge marsh, and drains in opposite directions from a shallow center area (station 5). Maximum creek width was 10 meters, and maximum depth was 0.7 meter (station 8). At station 5, the creek forms an 8-centimeter-wide depression in a sparsely vegetated, dark muddy area. Because of time constraints, stations 4 and 7 were not sampled. Two small tidal creeks in the sedge marsh were sampled by aquatic sweep net on 6 April 1978. The creeks are about 0.5 meter wide and 0.5 meter deep and form part of the dendritic system that flows into the major creek.

Drift nets (Table 3) were set in the lower regions of the creeks in the sedge and mature high marshes to collect animals that represent available fish food. Large drift net samples were collected in a small, dendritic creek in the sedge marsh on 19 December 1977, and at the bayward mouth of the large tidal creek on 16 October 1978 and 26 April 1979. A small creek was also sampled on 6 February 1978 using the small drift net. Large drift net samples in the mature high marsh were collected at a single location in the lower region of a major tidal creek on 17 October 1978, 1 November 1978, and 12 April 1979. A small drift net sample was obtained in a small tributary on 12 April 1979.

e. Tidal Flats. Infaunal samples were collected by large and medium corers (Table 3) over 30- by 60-meter grids located on tidal flats adjoining the low sand (Netarts Bay) and sedge (Siletz Bay) marshes. The grids were marked at 1-meter intervals producing 1,800 potential sample areas. Ten of these were randomly selected for each set of samples. At each area, a 10-centimeter-deep medium corer sample and a 30-centimeter-deep larger corer sample were collected. Medium corer samples were screened on 0.5-millimeter sieve and the large corer samples on a 2-millimeter sieve.

3. Fish Studies.

Fish were collected with seines and an otter trawl from several marsh habitats and in the open bay of each estuary. A comparison was made of the species composition and food habits of the bay fauna and the marsh fauna.

a. Collection. [illegible] were made by otter trawl on 2-3 June 1978 [illegible] September 1978 in Siletz Bay. Fish were taken by [illegible] (18 September 1978) and mature high marsh (1 [illegible] 78), and in the tidal creeks at sites which [illegible] were sampled for aquatic invertebrates. Also, [illegible] were seined for juvenile salmonids and [illegible]. Twenty additional seine samples were [illegible] and [illegible] mudflat, and slough habitats.

Only part of the [illegible] since the primary objective was to document habi[illegible] and to provide specimens for stomach content [illegible] large numbers of the same species were caught in a [illegible] subsample of each species representing [illegible] was retained. Fish were preserved in 10-percent [illegible] formalin in the field. The abdominal cavities of all [illegible] were opened to allow penetration of the preservative. [illegible] the fish were transferred to 70-percent isopropanol for [illegible] specimens were identified to species and measured for [illegible].

b. Stomach Content [illegible] stomach contents of 10 to 12 fish from a sample were analyz[illegible] stomachs from 27 samples were analyzed. The fish [illegible] species composition and size distribution of the [illegible].

Stomach content analysis [illegible] removing the stomach and estimating stomach fullness, digestion [illegible], and volumes and numbers of the different food items. [illegible] using a binocular dissecting microscope and a grided [illegible]. The state of the bolus was rated on a scale of 0 to 9, based on [illegible] (i.e., 0 = nothing recognizable; 9 = totally [illegible]). The volume (but not number of items) of unrecognizable [illegible] as a separate item. Prey items were identified [illegible] used in the invertebrate studies.

1. General.

The structure of [illegible] fish communities is depicted on a taxonomic [illegible] trophic basis. In both cases, the data are [illegible] of relative abundance. For the trophic interpretation [illegible] was assigned to a trophic type (herbivore, [illegible], omnivore, scavenger, nonfeeder, and unknown). [illegible] are based on the stomach contents [illegible].

Drift net data [illegible] because of sampling difficulties [illegible] aquatic sweep net collections in tidal creeks are [illegible] information. Appendixes

B and C are taxonomic checklists of invertebrates and fish, respectively. Tabular summaries of the data are provided in Appendixes D (invertebrate collections), E (fish collections), and F (fish stomach contents).

2. Taxonomic Structure of Invertebrate Communities.

Soil infauna, sampled with a small corer, was dominated by oligochaetes and several dipterous larvae (Fig. 4). Ceratopogonid and chironomid larvae were most abundant in the low marshes (sand, silt, and sedge); tipulid larvae were most abundant in the two high marshes. The high marshes had a more diverse dipterous fauna. Certain taxa numerous in the low marshes samples--Acarina, Isopoda, and the amphipod genera *Corophium* and *Orchestia*--are epifaunal forms which were collected on the surface by the corer. Another amphipod genus, *Grandidierella*, lives in tubes both in the substrate and on vegetation, depending on species. The dominant species in the marshes was *C. salmositica*, which is an abundant animal common in muddy estuarine tidal flats. Its high density in the low silt marsh reflects the fact that the samples were collected near the edge of a prograding marsh where it merges with a tidal flat.

The fauna of low vegetation (pooled quadrat samples) included high densities of Acarina in all marshes (Fig. 5). Collembola were abundant only in the high marshes, while Homoptera and Homoptera occurred in both low and high marshes. The isopod, *Orchimosphaeroma lutea*, was abundant only in the low silt marsh. The high marsh fauna included four families of Collembola, two of Homoptera, and eight of Coleoptera. Aphididae (Homoptera) and Limnebiidae (Coleoptera) inhabited some of the low marshes.

The invertebrate fauna of the high vegetation sampled by terrestrial sweep net was broadly similar for all five marshes in that Acarina, Homoptera, Diptera, Araneae, and Hymenoptera were abundant in all marshes (Fig. 5). Homoptera in the low marshes were predominantly saldids, and in the high marshes miirids and pentostomids, although these were not abundant. The composition of the Homoptera varied among marshes, although delphacidae was generally abundant. The dipterous fauna tended to be more diverse in the high marshes; the low number of taxa in the low sand marsh likely relates to the poor vegetation cover afforded by pickleweed and saltgrass.

The fauna of the low sand marsh debris line was composed chiefly of Acarina, Collembola, Amphipoda (*Orchestia traskiana*), and Aranae (Fig. 6). This fauna differs in part from the fauna of the low vegetation and high vegetation habitats of the low sand level marsh, although Acarina and limnebiid beetles were abundant in all three habitats. Collembola (mostly isotomids) were abundant in the debris line, but absent from both high and low vegetation. Debris line dipterans were mostly sphaeroceroids, as contrasted with chironomids and ceratopogonids found in the low vegetation, and muscids in the high vegetation.

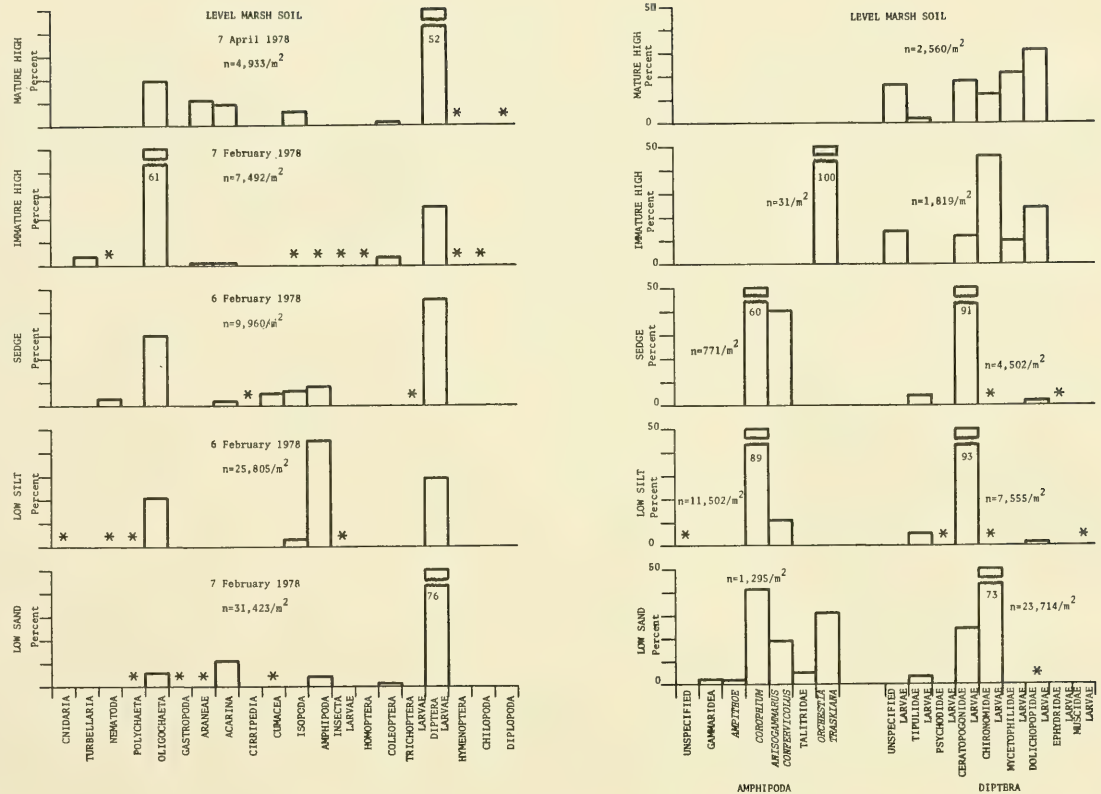


Figure 3. Taxonomic structure of level marsh soil invertebrate community. n = average for replicate samples on dates shown. * = <1 percent. Life stage is adult unless otherwise indicated.

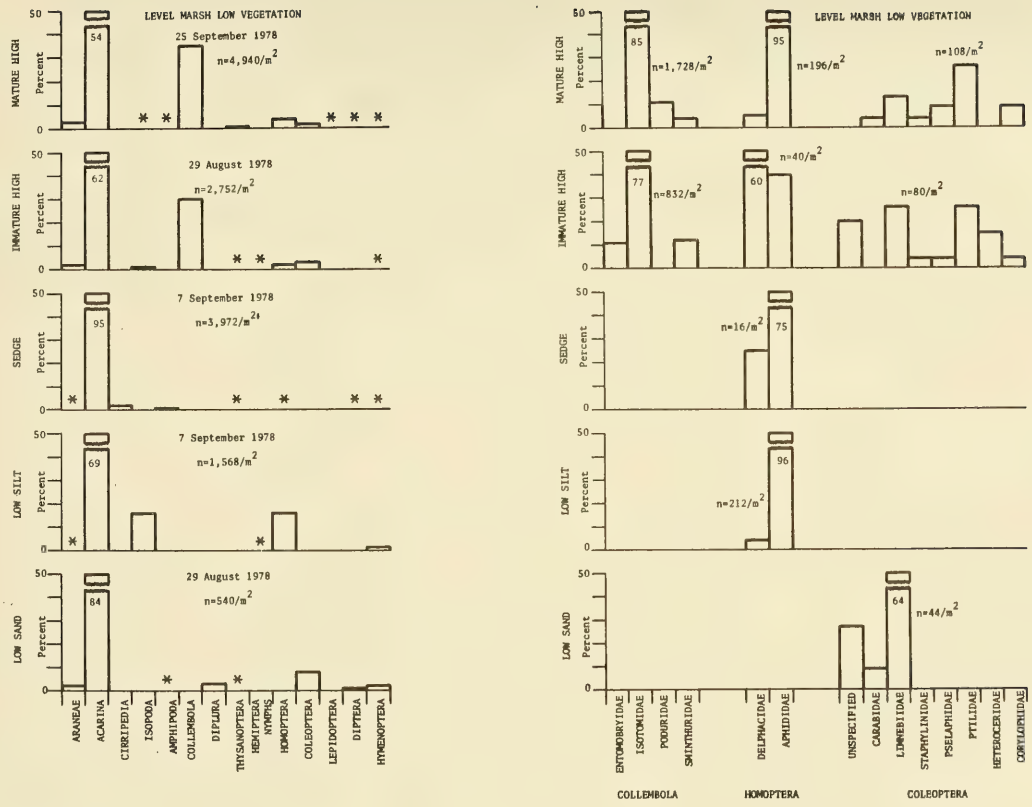


Figure 4. Taxonomic structure of level marsh low vegetation invertebrate community. n = average for replicate samples on dates shown. * = <1 percent. Life stage is adult unless otherwise indicated.

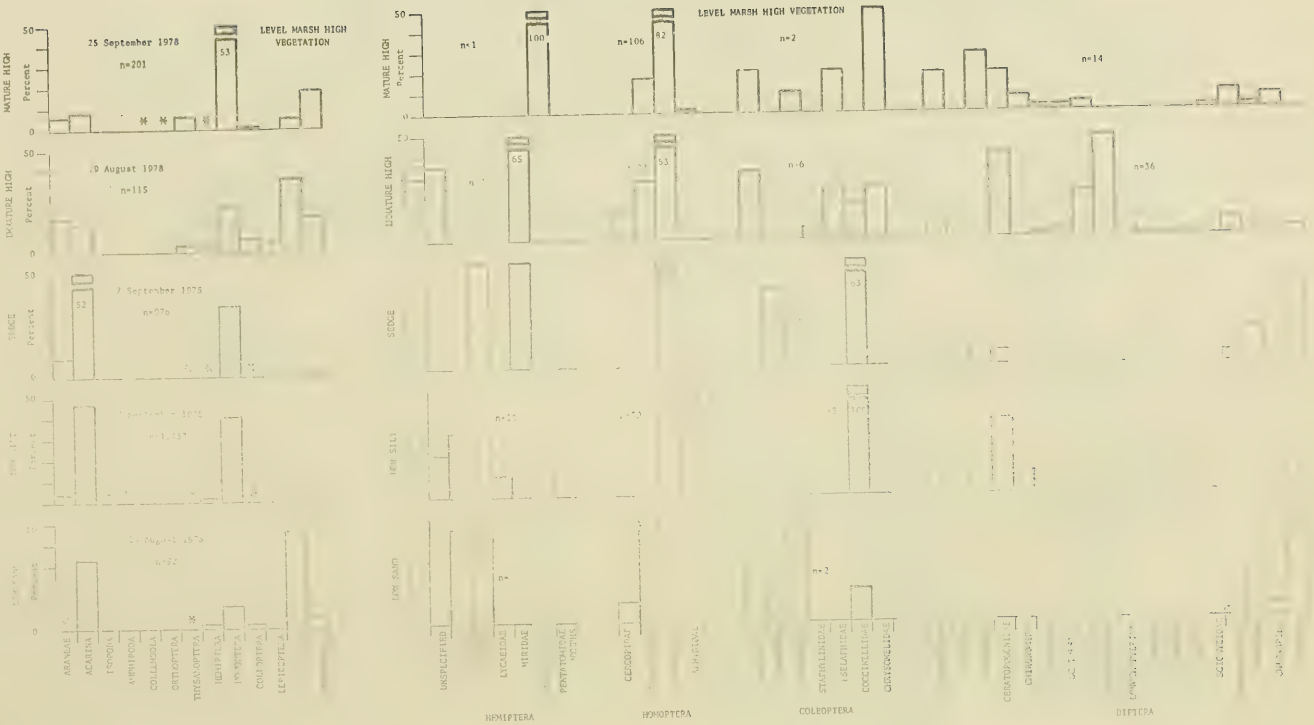


Figure 5. Taxonomic structure of level marsh high vegetation invertebrate community. n = average for replicate samples on dates shown. * = <1 percent. Life stage is adult unless otherwise indicated.

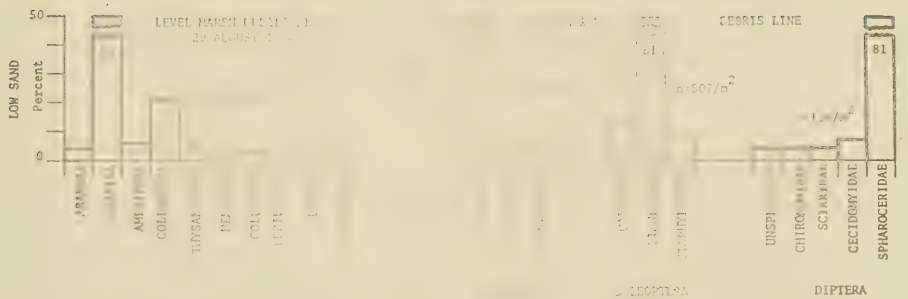


Figure 6. Taxonomic [illegible] invertebrate community. [illegible] samples on dates shown. * = <1 percent. [illegible] unless otherwise indicated.

Faunal composition [illegible] (sampled by the large enclosure method) [illegible] and terrestrial forms (Figs. 7 and 8). [illegible] in the low sand and sedge marshes, [illegible] and dipterous larvae in the immature [illegible] were moderately abundant in the low [illegible] they were frequently found inside [illegible] which made their quantification [illegible] was captured from the submerged vegetation [illegible] limnebiids, staphylinids, and coccinellids. [illegible] marsh, carabids and hydrophilids were collected. [illegible] that the hydrophilids, which are aquatic, moved into [illegible] during its rare submergence. These animals prob[illegible] nearby pan or eroded bank habitats. Diptera of the submerged level marsh were primarily larvae psychodids, ceratopogenids, and chironomids, with some variation among marshes. Homoptera, although not abundant in the submerged marshes, was represented by three families--Cicadellidae; Delphacidae, the most abundant [illegible]

Aquatic crustaceans [illegible] marshes were the amphipods *Corophium* spp., [illegible] and *Orchestia traskiana*, the isopod *G.* [illegible] the two cumacean genera, *Hemileucon* and *Cumella* (Figs. 7 and 8) [illegible] and *A. confervicolus* were especially abundant in the [illegible] marsh. Dense summer populations of *G. lutea* swarmed in the [illegible] depressions between vegetated areas. In the low sand marsh, large numbers of talitrid amphipods migrated upshore ahead of advancing tides, seeking shelter in dead eelgrass and other debris. [illegible] material floated within the large enclosure sampling grid, [illegible] and other animal densities measured very high.

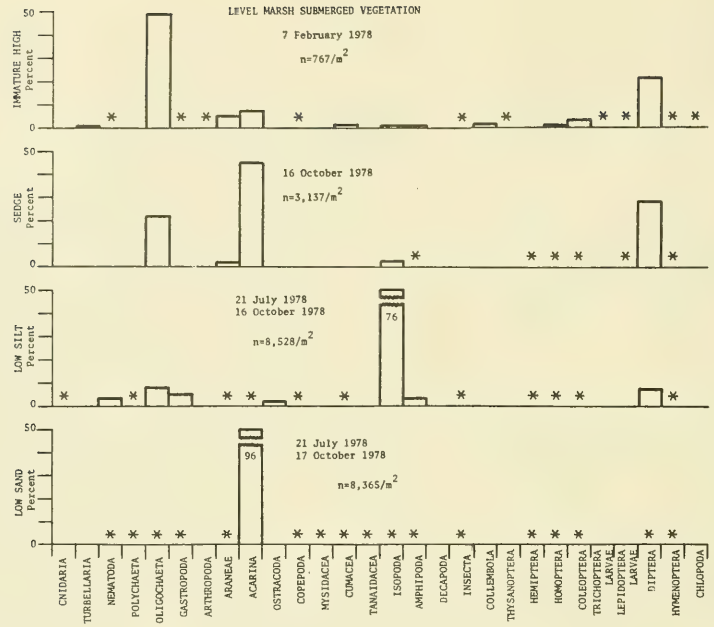


Figure 7. Taxonomic structure of level marsh submerged vegetation invertebrate community. n = average for replicate samples on dates shown. * = <1 percent. Life stage is adult unless otherwise indicated.

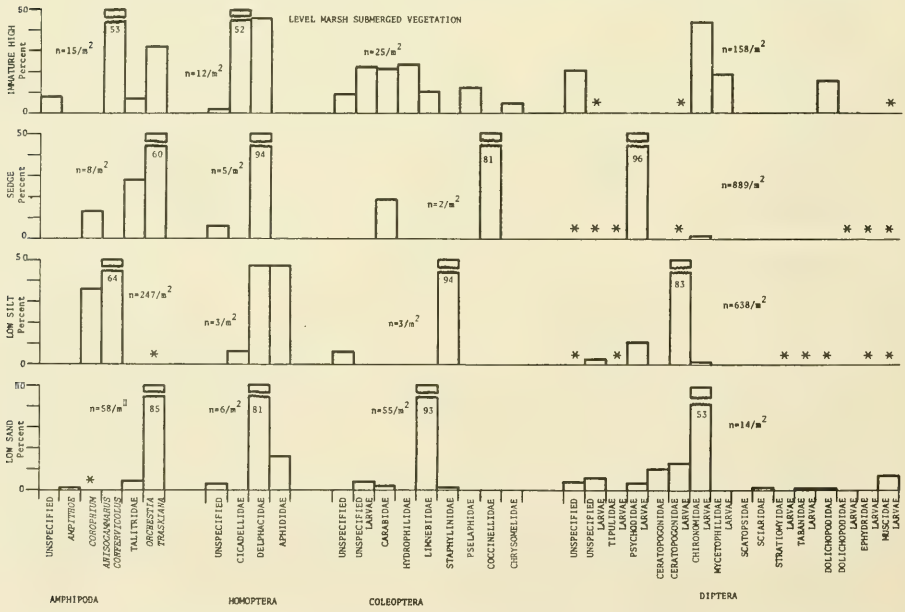


Figure 8. Taxonomic structure of level marsh submerged vegetation invertebrate community. n = average for replicate samples on dates shown. * = <1 percent. Life stage is adult unless otherwise indicated.

Several pans in the high marshes sampled by aquatic sweep net were inhabited by a variety of aquatic forms (Fig. 9). The immature high pan had large numbers of copepods (mostly harpacticpods), the amphipod, *A. confervicolus*, and oligochaetes. The mature high pans also contained amphipods and oligochaetes; corixids, and ephydrid and culicid larvae were also abundant.

Infauna of tidal creeks in the sedge and mature high marshes were similar (Fig. 10). Oligochaetes, polychaetes, and amphipods were the most abundant forms in each creek. Capitellids and ampharetids dominated the polychaete fauna in both creeks, although spirobids and spionids were also abundant in the mature high creek. Amphipods were mostly *Corophium* and *Anisogammarus confervicolus*, but included some talitrids and *Ampithoe* in the mature high creek. *Macoma balthica*, a small tellinid bivalve, was common in the sedge creek but absent from the mature high creek.

Animals collected in the tidal creeks by aquatic sweep net were a mixture of aquatic and terrestrial animals also collected in large enclosure samples and in creek infauna samples (Fig. 11). Presumably,

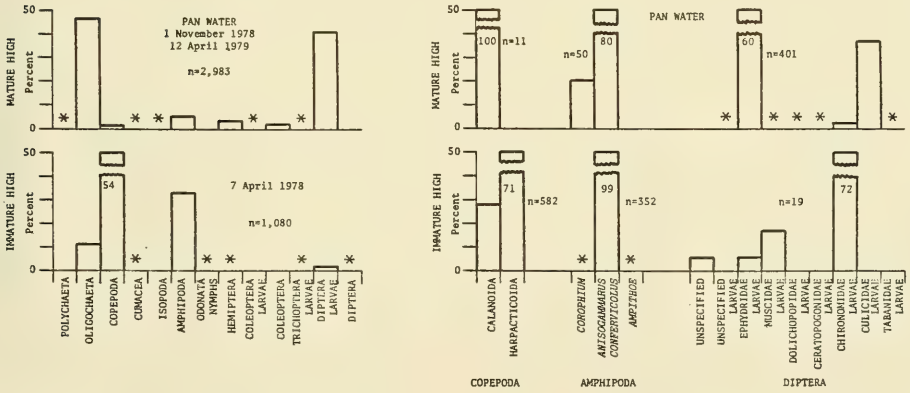


Figure 9. Taxonomic structure of pan water invertebrate community. n = average for replicate samples on dates shown. * = <1 percent. Life stage is adult unless otherwise indicated.

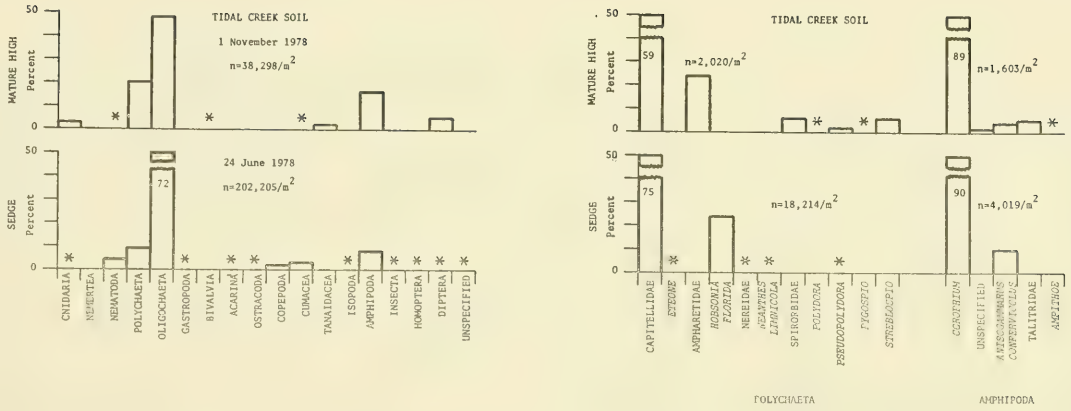


Figure 10. Taxonomic structure of tidal creek soil invertebrate community. n = average for replicate samples on dates shown. * = <1 percent. Life stage is adult unless otherwise indicated.

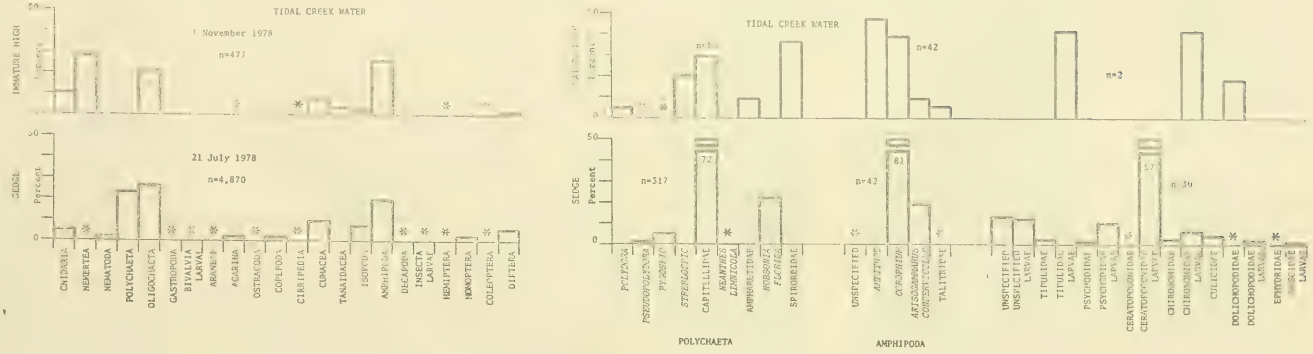


Figure 11. Taxonomic structure of tidal creek water invertebrate community. n = average for replicate samples on dates shown. * = <1 percent. Life stage is adult unless otherwise indicated.

terrestrial animals in the creek fell into the water or were washed in during tidal submergence. Diptera of the two creeks were quite different, being quite diverse in the sedge creek and limited to a few taxa in the mature high creek. This may reflect the comparatively large amounts of filamentous algae occurring in the sedge creek at the time of sampling. The algae appeared to have high densities of dipterous larvae and other taxa captured by the aquatic sweep net and the corer. The grapsid crab, *Hemigrapsus oregonensis*, was also common in the algae, although it was not quantitatively [illegible].

The infauna of the sedge tidal flat was similar in many respects to the infauna of the sedge creek infauna (Fig. 12). The tidal flat is located near the bayward outlet of the creek, and both the creek and the tidal flat have muddy substrates. The tidal flat infauna was relatively poor in Diptera, however, having only low densities of dolichopodid larvae. Other differences included a lower density of a burrowing cnidarian, and the addition of a sacoglossan gastrod, *Alderia*.

The infauna of the sandy tidal flat located below the low sand marsh (Netarts Bay) differed from the infauna of the sedge tidal flat in having a relatively greater abundance of polychaetes (principally *Haploscoloplos*) and an *Eohaustorius-Paraphoxus* amphipod fauna, in contrast to the *Corophium*-dominated fauna at the sedge mudflat. The decapod shrimp, *Callianassa*, and the bivalve, *Cryptomya californica*, an inhabitant of *Callianassa* burrows, were also present in the sandy tidal flat.

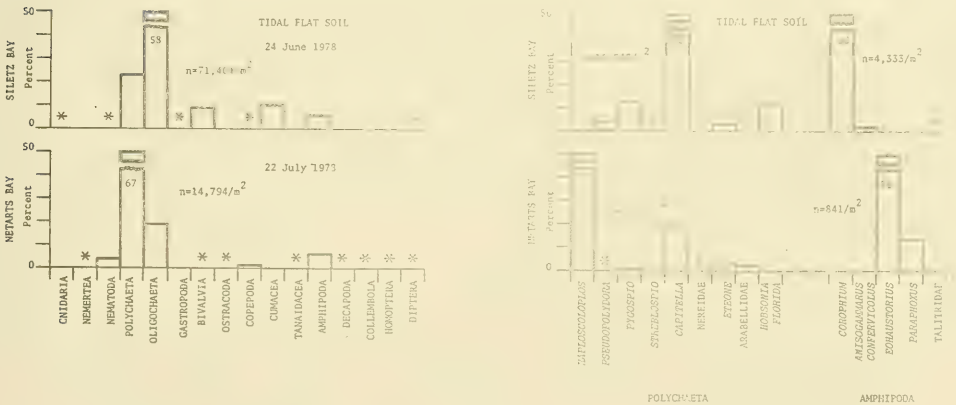


Figure 12. Taxonomic structure of pan water invertebrate community. n = average for replicate samples on dates shown. * = <1 percent. Life stage is adult unless otherwise indicated.

3. Trophic Structure of Invertebrate Communities.

The trophic structure of the major terrestrial and aquatic marsh communities is presented in Figures 13 to 18. Data from large enclosure and aquatic sweep net collections have been omitted because these collections include both submerged terrestrial and aquatic species. An analysis of the trophic structure of such assemblages would be misleading, since they do not represent communities as such.

The major feature of these figures is the predominance of detritivores and scavengers in most of the communities. Oligochaetes, amphipods (*Corophium*), and Acarina were the principal detritivores of the soil communities; Acarina were the most abundant detritivores in low vegetation, high vegetation, and debris line communities. Herbivore populations (mostly homopterans) were abundant in the high vegetation especially in high marshes, where their densities exceeded those of the detritivores. Scavengers were numerous in the soil marsh (ceratopogonid and chironomid larvae), in the low vegetation of the low marsh (isopods, amphipods, limnebiid beetles), and in the debris line (amphipods, limnebiids).

Carnivores generally comprised a small fraction of the animal life in soil and low vegetation habitats. However, dolichopodid (Diptera) larvae were abundant in high marsh soils, and also occurred in low marsh soils. The carnivore populations of low vegetation were composed primarily of Araneae and staphylinid beetles. High vegetation carnivores tended to be more numerous, and included several types of dipterous adults (Dolichopodidae, Ceratopogonidae and Muscidae) and Araneae. The debris line carnivores were Araneae and Saldidae (Hemiptera) which occurred in moderate abundance.

The trophic structure of infaunal communities of the tidal creeks and tidal flats was heavily weighted to the detritivorous components (Figs. 17 and 18). In all creek and tidal flat communities, oligochaetes and capitellid polychaetes were among the dominant detritivores. Other detritivores were *Haploscoloplos* (Polychaeta) and *Corophium* (Amphipoda). Common carnivores were the Polychaete *Eteone* and a small cnidarian polyp. Although algae covered much of the sedge creek and tidal flat substrate surface at the time of sampling, macrofaunal herbivores were rare.

4. Composition of Fish Communities.

Of 26 species of fish captured in seine and trawls, 2 species (staghorn sculpin, *Leptocottus armatus*, and the threespine stickleback, *Gasterosteus aculeatus)* dominated the catches in both high and low marshes (Table 4). The two species were common in creeks, pans, and submerged vegetation at the marsh edge, as well as in nonmarsh habitats. However, staghorn sculpin were not captured in low marsh pans. Threespine stickleback captured in marsh habitats were juveniles

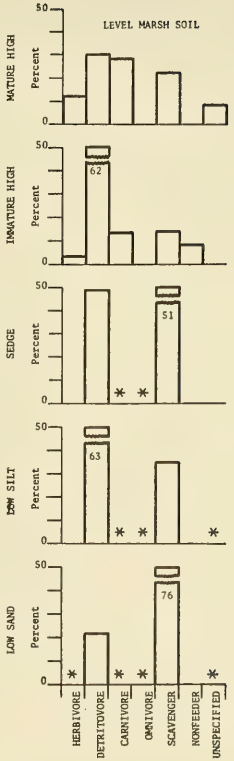


Figure 13. Trophic structure of level marsh soil invertebrate community. * = <1 percent.

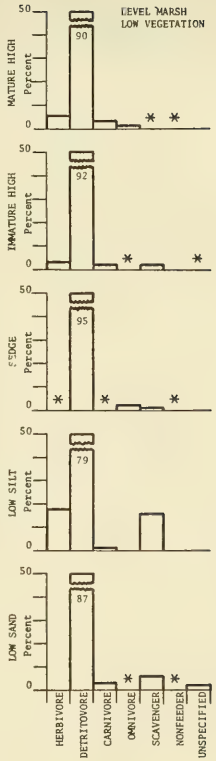


Figure 14. Trophic structure of level marsh low vegetation invertebrate community. * = <1 percent.

Figure 15. Trophic structure of level marsh high vegetation invertebrate community. * = <1 percent.

Figure 16. Trophic structure of level marsh debris line invertebrate community. * = <1 percent.

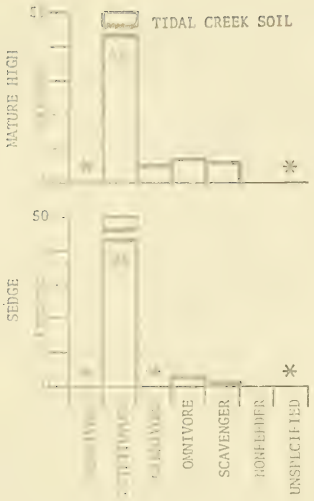


Figure 17. Trophic structure of tidal creek soil invertebrate community. [illegible] percent.

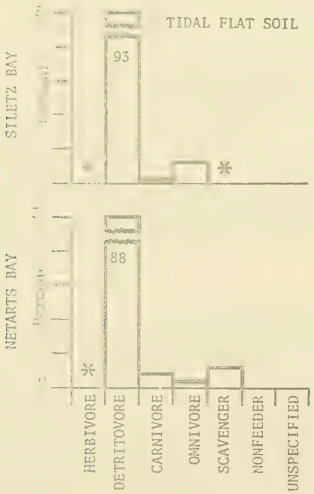


Figure 18. Trophic structure of tidal flat soil invertebrate community. * = <1 percent.

Table 4. Occurrence of fish species in several marsh and nonmarsh habitats.[1]

FISH	High Marsh		Low Marsh[2]			Other		
	Pan	Creek	Level	Pan	Creek	Slough	Tidal flat	Bay channel
Number of Samples	3	5	5	2	8	4	4	11
Pacific sandlance *(Ammodytes hexapterus)*								/ / / /
Topsmelt *(Atherinops affinis)*					/ / / /			
Speckled sanddab *(Citharichthys stigmaeus)*								XXXXXXXX
Staghorn sculpin *(Leptocottus armatus)*	XXXXXXXX	XXXXXXXX	XXXXXXXX		XXXXXXXX	XXXXXXXX	XXXXXXXX	XXXXXXXX
Buffalo sculpin *(Enophrys bison)*								/ / / /
Cabezon *(Scorpaenichthys marmoratus)*								/ / / /
Prickly sculpin *(Cottus asper)*					/ / / /	/ / / /		
Coastal sculpin *(Cottus aleuticus)*					/ / / /			
Shiner surfperch *(Cymatogaster aggregata)*			/ / / /		/ / / /	XXXXXXXX	XXXXXXXX	
White surfperch *(Phanerodon furcatus)*						/ / / /		
Northern anchovie *(Engraulis mordax)*						/ / / /		
Pacific tomcod *(Microgadus proximus)*						/ / / /		
Tubesnout *(Aulorhynchus flavidus)*								/ / / /
Threespine stickleback *(Gasterosteus aculeatus)*	XXXXXXXX	XXXXXXXX	XXXXXXXX	XXXXXXXX	XXXXXXXX	XXXXXXXX	/ / / /	/ / / /
Lingcod *(Ophiodon elongatus)*								XXXXXXXX
Kelp greenling *(Hexagrammos decagrammus)*								XXXXXXXX
Surf smelt *(Hypomesus pretiosus)*		/ / / /	XXXXXXXX		/ / / /	XXXXXXXX	/ / / /	/ / / /
Saddleback gunnel *(Pholis ornata)*						/ / / /	/ / / /	/ / / /
Starry flounder *(Platichthys stellatus)*			/ / / /			/ / / /	XXXXXXXX	/ / / /
English sole *(Parophrys vetulus)*							/ / / /	XXXXXXXX
Sand sole *(Psettichthys melanostictus)*							/ / / /	/ / / /
Chum salmon *(Oncorhynchus keta)*		/ / / /	XXXXXXXX			/ / / /		
Chinook salmon *(Oncorhynchus tshawytscha)*						/ / / /		/ / / /
Steelhead trout *(Salmo gairdneri)*						/ / / /		
Rockfish spp. *(Sebastes spp.)*								/ / / /
Snake prickleback *(Lumpenus sagitta)*								/ / / /
Bay pipefish *(Syngnathus leptorhynchus)*								/ / / /

[1]Results are based on seine samples (most habitats) and otter trawl samples (bay channel) collected on several dates in the two days; XXX=abundant, ///=present.

[2]Low marsh refers to low sand, low silt, and sedge marshes.

to adults (12 to 76 millimeters); staghorn sculpin were juveniles and young adults (17 to 173 millimeters) (Table 5).

Other species in marsh habitats were juvenile surf smelt (*Hypomesus pretiosus*) and juvenile chum salmon, captured primarily in low level marshes (Tables 4 and 5). The young chum salmon were seined along sparsely vegetated low marshes in both Netarts and Siletz Bays. In Netarts Bay, these salmon are occasionally abundant in the spring because of natural reproduction and the release of hatchery-reared juveniles. Those in Siletz Bay apparently result from a small natural run.

The most abundant fish species in the slough adjoining the sedge marsh were the shiner surfperch (*Cymatogasta aggregata*) and the threespine stickleback (Table 4). Nine other species were captured although in much lower numbers. These species included staghorn sculpin, northern anchovie (*Engraulis mordax*), starry flounder (*Platichthys stellatus*), and juvenile chinook salmon.

The largest variety of fish occurred in the bay channel, which contained species similar to those collected in marsh habitats and several juvenile marine species (Tables 4 and 5). The most abundant marine species in Netarts Bay were juvenile English sole (*Parophrys vetulus*), which invade northwest estuaries in large numbers during the spring.

Table 5. Size (fork length in millimeters) of fish species collected in several marsh and nonmarsh habitats.[1]

SPECIES	High Marsh		Low Marsh [2]		
	Pan	Creek	Level	Pan	Creek
Pacific sandlance *(Ammodytes hexapterus)*					
Topsmelt *(Atherinops affinis)*					38:2(32-44)
Speckled sanddab *(Citharichthys stigmaeus)*	3 4 5				
Staghorn sculpin *(Leptocottus armatus)*	56:29(44-76)	49:88(35-82)	38:115(18-67)		44:97(17-124)
Buffalo sculpin *(Enophrys bison)*					
Cabezon *(Scorpaenichthys marmoratus)*					
Prickly sculpin *(Cottus asper)*					36:4(34-41)
Coastal sculpin *(Cottus aleuticus)*					37:1(37)
Shiner surfperch *(Cymatogaster aggregata)*			75:1(75)		72:1(72)
White surfperch *(Phanerodon furcatus)*					
Northern anchovie *(Engraulis mordax)*					
Pacific tomcod *(Microgadus proximus)*					
Tubesnout *(Aulorhynchus flavidus)*					
Threespine stickleback *(Gasterosteus aculeatus)*	41:146(31-62)	39:216(22-58)	41:88(30-60)	22:46(12-33)	30:301(20-76)
Longcod *(Ophiodon elongatus)*					
Kelp greenling *(Hexagrammos decagrammus)*					
Surf smelt *(Hypomesus pretiosus)*		42:1(42)	53:97(40-64)		
Saddleback gunnel *(Pholis ornata)*					
Starry flounder *(Platichthys stellatus)*					
English sole *(Parophrys vetulus)*					
Sand sole *(Psettichthys melanostictus)*					
Chum salmon *(Oncorhynchus keta)*		39:1(39)	44:57(36-66)		
Chinook salmon *(Oncorhynchus tshawytscha)*					
Steelhead trout *(Salmo gairdnerii)*					
Rockfish spp. *(Sebastes spp.)*					
Snake prickleback *(Lumpenus sagitta)*					
Bay pipefish *(Syngnathus leptorhynchus)*					

SPECIES	Other		
	Slough	Tidal flat	Bay Channel
Pacific sandlance *(Ammodytes hexapterus)*			74:8(61-85)
Topsmelt *(Atherinops affinis)*			
Speckled sanddab *(Citharichthys stigmaeus)*			57:63(28-115)
Staghorn sculpin *(Leptocottus armatus)*	57:59(28-173)	90:16(36-193)	73:66(37-171)
Buffalo sculpin *(Enophrys bison)*			82:6(34-214)
Cabezon *(Scorpaenichthys marmoratus)*			53:5(46-66)
Prickly sculpin *(Cottus asper)*	142:1(142)		
Coastal sculpin *(Cottus aleuticus)*			
Shiner surfperch *(Cymatogaster aggregata)*	82:438(50-154)	35:77(11-119)	68:1(68)
White surfperch *(Phanerodon furcatus)*	76:1(76)		
Northern anchovie *(Engraulis mordax)*	83:4(73-110)		
Pacific tomcod *(Microgadus proximus)*	79:1(79)		
Tubesnout *(Aulorhynchus flavidus)*			100:3(75-139)
Threespine stickleback *(Gasterosteus aculeatus)*	35:45(25-60)	67:4(60-73)	50:4(32-59)
Longcod *(Ophiodon elongatus)*			96:34(72-120)
Kelp greenling *(Hexagrammos decagrammus)*			67:23(59-81)
Surf smelt *(Hypomesus pretiosus)*	69:30(34-172)	39:4(36-42)	75:1(75)
Saddleback gunnel *(Pholis ornata)*	94:2(80-107)	92:9(77-128)	74:11(62-129)
Starry flounder *(Platichthys stellatus)*	152:6(97-228)	133:27(75-243)	177:17(70-425)
English sole *(Parophrys vetulus)*		56:7(33-124)	37:340(20-127)
Sand sole *(Psettichthys melanostictus)*		100:1(100)	105:5(97-127)
Chum salmon *(Oncorhynchus keta)*			
Chinook salmon *(Oncorhynchus tshawytscha)*	95:14(62-105)		90:1(90)
Steelhead trout *(Salmo gairdnerii)*	180:1(180)		
Rockfish spp. *(Sebastes spp.)*			42:1(42)
Snake prickleback *(Lumpenus sagitta)*			120:2(74-166)
Bay pipefish *(Syngnathus leptorhynchus)*			220:5(156-245)

[1]Results are based on seine samples (most habitats) and otter trawl samples (bay channel and tidal flat) collected on several dates in the two bays.

[2]Low marsh refers to low sand, low silt, and sedge marshes.

[3]Mean.

[4]Sample size.

[5]Range.

5. Fish Food Habits.

Fish stomach contents data are summarized in Figures 19 to 24, which combines data for all sampling sites and dates for each habitat. Staghorn sculpin, threespine stickleback, and juvenile chum salmon captured in submerged level marshes consumed a variety of predominantly aquatic animals, including amphipods (*Corophium* and *Anisogammarus*), harpacticoid copepods, cumaceans (*Hemileucon*), oligochaetes, and polychaetes (Fig. 19). The diet is diverse partly because data from several samples have been combined. Terrestrial prey were not eaten except by the chum salmon, which ate small amounts of adult insects

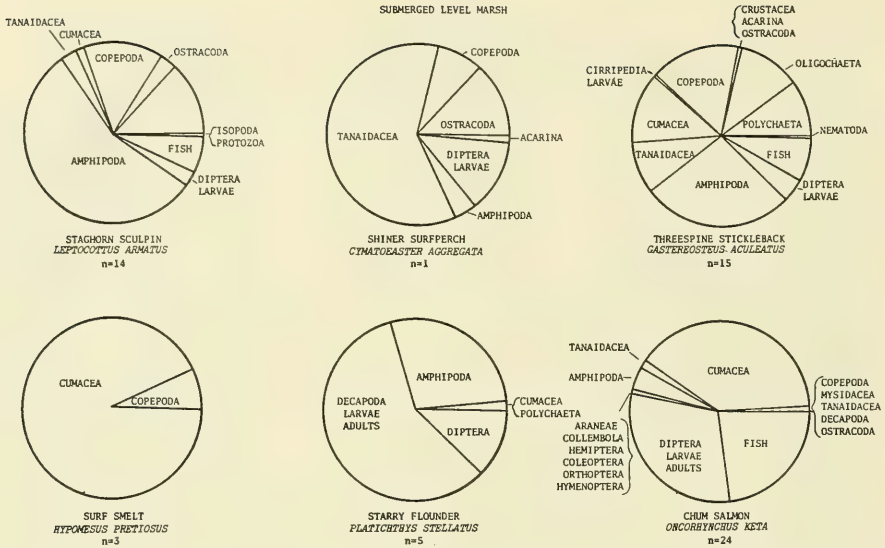


Figure 19. Fish stomach contents from submerged level marsh, based on fraction each prey type contributed to total bolus volume. Life stage is adult unless otherwise stated.

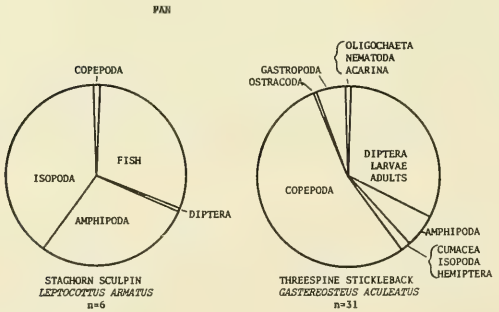


Figure 20. Fish stomach contents from pan, based on fraction each prey type contributed to total bolus volume. Life stage is adult unless otherwise stated.

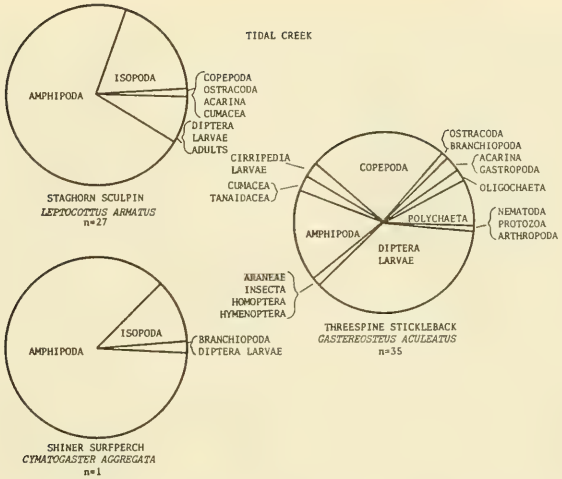


Figure 21. Fish stomach contents from tidal creek, based on fraction each prey type contributed to total bolus volume. Life stage is adult unless otherwise stated.

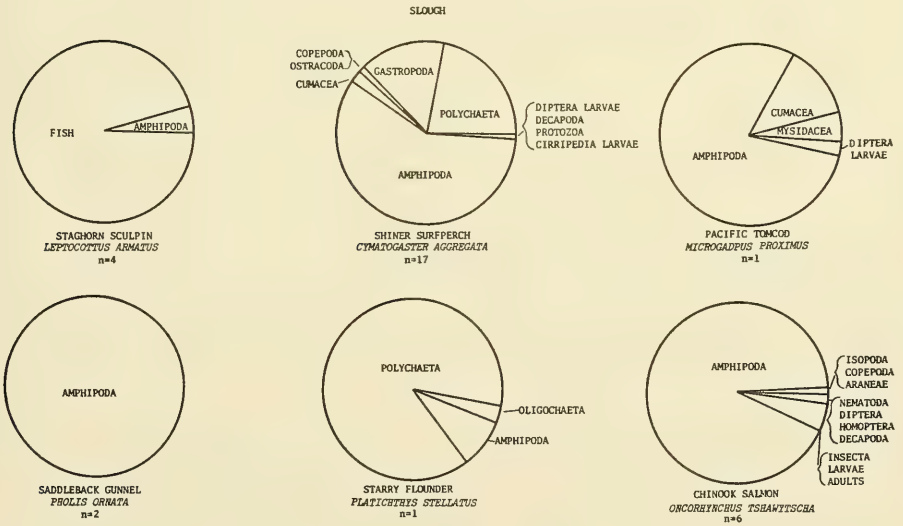


Figure 22. Fish stomach contents from slough, based on fraction each prey type contributed to total bolus volume. Life stage is adult unless otherwise stated.

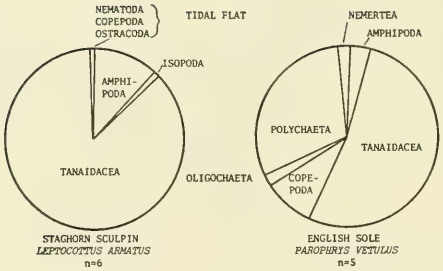


Figure 23. Fish stomach contents from tidal flat, based on fraction each prey type contributed to total bolus volume. Life stage is adult unless otherwise stated.

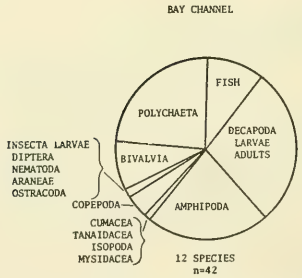


Figure 24. Fish stomach contents from bay channel, based on fraction each prey type contributed to total bolus volume. Life stage is adult unless otherwise stated.

and spiders. They also consumed various dipterous larvae and pupae, especially psychodids, found in marsh habitats. In the chum salmon's stomach, insect foods often formed a surface layer over a ball of flatfish larvae, indicating that the salmon fed subtidally and then fed along the shoreline. The most abundant food organism in the salmon was *Hemileucon*, which comprised 39 percent of the stomach content. Harpacticoids were abundant in the stomachs of staghorn sculpin and stickleback but not in the chum salmon. Starry flounder mostly ate decapod larvae, adult *Callianassa*, and amphipods. Surf smelt mostly consumed *Hemileucon*.

In marsh pans, staghorn sculpin consumed mostly amphipods, aquatic isopods, and small fish, while threespine stickleback ate a large variety of animals, including calanoid and harpacticoid copepods, and ceratopogonid larvae (Fig. 20). Very little of the diet of the two fish could be considered terrestrial, although some of the dipterous larvae live in marsh litter or soils.

Staghorn sculpin and threespine stickleback captured in tidal creeks had diets very similar to fish captured in pans (Fig. 21). Sculpins concentrated on amphipods and isopods; the stickleback diet included a total of 40 prey types dominated by harpacticoids and ceratopogonid larvae.

Several species of fish captured in the slough near the sedge marsh consumed large quantities of amphipods (Fig. 22). Shiner surfperch supplemented this food with the gastropod *Alderia* and polychaetes. Ampharetid polychaetes (probably *Hobsonia florida*) were eaten by both the perch and the starry flounder.

Young staghorn sculpin and English sole captured in the tidal flat below the low sand marsh ate tanaids, amphipods, harpacticoids, and polychaetes (Fig. 23). These invertebrates are characteristic forms of tidal flat substrates. There is little indication of use of marsh foods by the sculpin or sole.

Among the dozen fish species examined which were captured in bay channels, the dominant foods were decapods (especially *Crangon*), polychaetes, and a variety of amphipods, fish, and other aquatic animals (Fig. 24). Terrestrial foods were of minor occurrence.

V. DISCUSSION

Marsh studies, especially those of vegetation, have concentrated on level marsh habitats due to their prevalence and importance as producers of organic detritus. However, nutrient transfer to aquatic food chains involves both bay detritus transport and secondary production by marsh invertebrates in pans, tidal creeks, and adjoining tidal flats. This study determined community composition, trophic structure, and food-chain relations for fauna in both level marsh and aquatic habitats in two Oregon estuaries.

Broadly viewed, the study revealed similarities between the terrestrial invertebrate communities of the Oregon marshes and those studied elsewhere on the Pacific and Atlantic coasts. The full extent of this similarity can not be assessed since the level of identification varied among the studies. The Oregon marsh study did not study seasonality or identify immature insects collected from exposed vegetation. However, the data provide a sufficiently accurate picture of community structure and aquatic food chains for comparison with other marsh communities. In these comparisons, the collection method is discussed in relation to the part of the community represented.

The invertebrate fauna of the level marsh, debris line, pan, tidal creek, and tidal flat habitats are summarized in Tables 6 and 7. The tables include animals captured by all sampling methods used in each of these habitats. Taxonomic diversity of the level marsh habitats was highest in the high level marsh, slightly lower in the low level marsh, and lowest in the debris line (Table 6). However, the habitats share several taxa. A similar overlap occurred in fauna of aquatic habitats (Table 7). Composition of the tidal creek infauna is similar to that of the muddy tidal flat. Taxa from this community also appear in tidal pans. More extensive sampling of pans, especially in the low marsh, would probably reveal greater similarities of pan and creek faunas than indicated here.

The fauna of the Oregon marsh soils, dominated by oligochaetes and dipterous larvae (Fig. 3), are not diverse partly because samples were collected during the winter and early spring when some insect species presumably rest in the egg state. The high abundance of oligochaetes and near absence of polychaetes contrasts with Cammen's 1976 results on macroinvertebrates of natural and planted salt marshes in North Carolina. In the natural marshes and at one bare soil site, polychaetes dominated (by biomass), while insect larvae and amphipods were dominant in some planted and bare soil sites. Composition of the marsh and creek polychaete fauna was similar. Among the several dipterous families Cammen lists, only Dolichopodidae was abundant in the Oregon marsh soils. High densities of Ceratopogonidae and Chironomidae occurred in the Oregon marshes and were sparse or absent from the North Carolina marshes. Both the North Carolina and Oregon lists are relatively short in comparison to Wall's (1973) list of taxa for Cape Cod marshes. Thus more extensive collections might show greater similarity between Atlantic and Pacific coast soil infauna.

The low vegetation was inhabited by dense populations of Acarina and, in high marshes, moderate populations of Collembola (Fig. 4). Acarina, Homoptera, and Diptera were the most abundant invertebrates in the high vegetation. Lane (1969) also found Homoptera and Diptera the dominant insect orders in the San Francisco Bay marsh. He collected by sweep net, aerial net, and blacklight, so his collections were most similar to the sweep net collections of high vegetation in this study. Cameron (1972), who also studied a San Francisco Bay

Table 6. Invertebrates characteristic of terrestrial habitats.[1]

TAXON	HABITAT			TAXON	HABITAT		
	High Level Marsh	Low Level Marsh	Debris Line		High Level Marsh	Low Level Marsh	Debris Line
Cnidaria				Coleoptera			
Halacampa (?) sp.		A		Carabidae	A	A	A
Turbellaria	A			Limnebiidae	A	A	A
Nematoda	A	A		Staphylinidae	A	A	A
Polychaeta				Pselaphidae	A		
Capitellidae		A		Ptiliidae	A		
Hobsonia florida		A		Heteroceridae	A		
Oligochaeta	A	A		Coccinellidae	A	A	
Aranae	A	A	A	Corylophidae	A		
Acarina	A	A	A	Chrysomelidae	A		
Cirripedia				Trichoptera			
Balanidae		A		Limnephilidae		L	
Cumacea				Lepidoptera	A		A
Cumella sp.		A		Pyralidae		L	
Isopoda				Diptera			
Gnorimosphaeroma lutea		A		Tipulidae	L	A,L	
Ligidium gracilis	A			Psychodidae	A	A,L	
Porcellio scaber	A			Ceratopogonidae	A,L	A,L	
Amphipoda				Chironomidae	A,L	A,L	A
Ampithoe sp.		A		Culicidae	A	A	
Corophium sp.		A		Mycetophilidae	L		
Anisogammarus confervicolus		A		Scatopsidae	A		
Orchestia traskiana	A	A	A	Sciaridae	A	A	A
Collembola				Cecidomyiidae			A
Entomobryidae	A			Dolichopodidae	A,L	A,L	
Isotomidae	A		A	Longchopteridae	A		
Onychiuridae	A		A	Phoridae	A		
Poduridae	A			Sepsidae	A		
Sminthuridae	A		A	Sciomyzidae	A		
Diplura		A		Sphaeroceridae	A	A	A
Orthoptera	A			Ephydridae	A	A	
Thysanoptera	A	A	A	Chloropidae	A	A	
Hemiptera				Muscidae	A	A,L	
Saldidae		A,N	A,N	Hymenoptera	A	A	A
Lygaeidae		A		Chilopoda	A		
Miridae	A	A					
Pentatomidae	A	A					
Homoptera							
Cercopidae	A	A					
Cicadellidae	A	A					
Delphacidae	A	A					
Aphididae	A	A					

[1]A = adults, L = larvae, N = nymphs.

Table 7. Invertebrates characteristic of aquatic habitats.[1]

TAXON	HABITAT				TAXON	HABITAT			
	Pan	Tidal Creek	Tidal Flat Sandy	Tidal Flat Muddy		Pan	Tidal Creek	Tidal Flat Sandy	Tidal Flat Muddy
Cnidaria		A		A	Tanaidacea				
Nemertea		A	A		*Pancolus* sp.		A	A	
Nematoda		A	A	A	*Leptochelia* sp.		A	A	
Polychaeta					Isopoda				
Haploscoloplos sp.			A		*Gnorimosphaeroma lutea*	A	A		
Polydora sp.		A			*Idotea resecata*		A		
Pseudopolydora sp.		A	A	A	Amphipoda				
Pygospio sp.		A	A	A	*Ampithoe* sp.	A	A		
Streblospio sp.		A		A	*Corophium* sp.	A	A		A
Capitellidae	A	A	A	A	*Anisogammarus confervicolus*	A	A		A
Neanthes limnicola		A			*Eohaustorius* sp.			A	
Eteone sp.		A	A	A	*Paraphoxus* sp.			A	
Arabellidae			A		Talitridae		A		A
Hobsonia florida	A	A		A	Decapoda				
Spirorbidae		A			*Callianassa* sp.			A	
Oligochaeta	A	A	A	A	*Hemigrapsus oregonensis*		A		A
Gastropoda					Collembola				
Alderia (?) sp.		A		A	Isotomidae			A	
Bivalvia					Odonata	N			
Cryptomya californica			A		Hemiptera				
Macoma balthica		A		A	Saldidae		A,N		
Aranae		A			Corixidae	A	A		
Acarina		A			Homoptera				
Ostracoda		A	A		Aphididae		A	A	
Copepoda					Coleoptera				
Calanoida	A	A			Hydrophilidae	A			
Cyclopoida		A	A		Limnebiidae	A			
Harpacticoida	A	A		A	Staphylinidae		A		
Cirripedia					Trichoptera				
Balanidae		A			Limnephilidae	L			
Cumacea					Diptera				
Cumella sp.	A	A		A	Tipulidae		A,L		
Hemileucon sp.		A		A	Psychodidae		A,L		
					Ceratopogonidae	L	A,L	A	
					Chironomidae	L	A,L		
					Culicidae	L	A		
					Tabanidae	L			
					Dolichopodidae	L	A,L		L
					Ephydridae	L	A		
					Muscidae	L	L		

[1]A = adult, L = larvae, N = nymphs.

marsh, used a clip-quadrat method to harvest animals from the total aboveground plant. Thus his method approximates a combination of the sweep net and clip-quadrat methods used in Siletz and Netarts Bays. He found that the orders Diptera, Coleoptera, and Hymenoptera contributed the most species, but that a pseudococcid homopteran was the most abundant species throughout the year. The dominant homopterans in Lane (1969) were delphacids and psyllids. In the Oregon marshes, aphidids, delphacids, and cicadellids varied as the most abundant homopterans, depending on marsh and collection method.

Adult dipterans in the Oregon marshes were almost absent in the low vegetation, and both abundant and varied in the high vegetation, where ceratopogonids, dolichopodids and muscids were common (Figs. 4 and 5). Dominant dipterans in Lane (1969) were Chloropidae, Ephydridae, and Chironomidae. Cameron (1972) did not provide abundance information for Diptera.

Davis and Gray (1966) used a sweep net to collect insects from the North Carolina salt marshes where the dominant orders were also Homoptera and Diptera. The most abundant homopterans were cicadellids and delphacids, and the most abundant dipterans were chloropids, dolichopodids, and ephydrids.

Collembolans were concentrated in the low vegetation of the Oregon high level marshes (Fig. 4). The most abundant family, Isotomidae, also occurred in Lane's (1969) core samples but were not abundant in his other samples. Davis and Gray (1966) did not list Collembola as abundant. In Cameron (1972), a podurid was extremely abundant in *Spartina foliosa* (a low marsh), especially after high tides. Paviour-Smith (1956) indicated that an isotomid was very abundant in the high marsh zone of a New Zealand salt meadow which she sampled using a cylindrical enclosure. She points out that collembolan densities can be erratic due to rapid summer reproductive cycles and the fact that the animals float onshore with the incoming tide where they remain in dense colonies when the tide recedes.

The coleopterous families Coccinellidae and Chrysomellidae were collected in the Oregon marshes (Fig. 5), as well as in the Atlantic coast marsh (Davis and Gray, 1966) and in San Francisco marshes (Lane, 1969). Paviour-Smith (1956) does not list these families. The mention of several other families (e.g., Carabidae, Staphylinidae, Curculionidae) varied in these studies, but there was no consistent pattern to their occurrence. Limnebiidae, abundant in the low sand marsh of Netarts Bay, was not mentioned in the other studies.

Of four terrestrial families of Hemiptera found in the Oregon marshes (Table 6), Lygaeidae, Miridae, and Pentatomidae were described by Davis and Gray (1966) as the most abundant hemipterans in North Carolina marshes. The remaining Oregon family, Saldidae, was listed by Lane (1969) as occurring in the San Francisco marsh along with Miridae, Pentatomidae, and two other families not found in the Oregon marshes.

The order Hymenoptera was relatively low in abundance in the low marshes and of moderate abundance in the high marshes (Fig. 3). Few ants (Formicidae) were captured, even in the high marshes, possibly because of the small sampling areas. The majority of the hymenopterans collected were wasps and similar flying forms, which were not further identified. Davis and Gray (1966) stated that all the common Hymenoptera in the North Carolina marsh were ants; Lane (1969) reported that although an ant species was the most prevalent soil insect in his study, several wasp species were also collected.

Thysanoptera were common only in the high marshes (high vegetation) of the present study (Fig. 5). Few were identified in Paviour-Smith (1956), Davis and Gray (1966), Lane (1969) and Cameron (1972).

Other terrestrial insect orders collected in the Oregon marshes were Lipidoptera, Diplura, and Orthoptera (Table 6). These were all of low occurrence in the San Francisco marshes (Lane, 1969; Cameron, 1972). However, Teal (1962), Davis and Gray (1966), and Marples (1966) indicated that grasshoppers (*Orchelimum*) may be common and trophically important in Atlantic coast marshes. The scarcity of orthopterans in Pacific coast collections may be both a matter of chance and the animal's ability to escape collection. However, large populations were not observed in the Oregon marshes.

The high Acarina populations found in the Oregon low marshes (Fig. 7) have received little attention elsewhere. In contrast, however, Paviour-Smith's (1956) kite diagrams showed a strong zonation of mites by family, and indicated that highest population density occurred in higher marshes.

Araneae populations were relatively low in abundance in the low vegetation and, except in the low sand marsh, moderate in abundance in the high vegetation (Figs. 4 and 5). Barnes (1953) provides a thorough description of maritime spider communities in North Carolina.

A striking feature of the Oregon marsh collections is the scarcity of gastropods, especially in light of MacDonald's (1977) observation that *Assimerea translucens* is ubiquitous across Pacific coast marshes, and that gastropod densities often reach several thousand per square meter. Gastropods are common members of level marsh fauna on the Atlantic coast (Teal, 1962; Nixon and Oviatt, 1973), although Paviour-Smith (1956) apparently found few or no gastropods in New Zealand marshes. It seems unlikely that gastropods were common in the Oregon marsh study areas, since several sites were investigated with varying techniques. More likely, these differences illustrate high variability in faunal composition.

The fauna of the debris line (Table 2) on the low sand marsh is an interesting blend of taxa found in other habitats. Like other level marsh habitats, the debris line contained large numbers of Acarina and low numbers of Araneae. The collembolan family Isotomidae

was abundant, as in the high marsh low vegetation suggesting that the debris line of the low sand marsh provides a rich, but unstable, habitat comparable to the accumulated litter found in high marshes. Other debris line taxa were the amphipod *Orchestia traskiana*, found in all the marshes, Saldidae (Hemiptera), found principally in the low marshes, and Limnebiidae (Coleoptera) found mostly in the low sand marsh. Dipterous adults were not abundant; most were spaerocerids, which occurred in both high and low marshes.

Several terrestrial taxa were collected from inundated vegetation during high tide (Figs. 7 and 8). Adult Coleoptera, Homoptera, Hemiptera, and Collembola appeared in many of the submerged marsh samples, where several beetle families were collected. Limnebiid beetles were as abundant in the submerged low sand marsh as they were during tidal exposure. Adult Diptera were rare except in the low sand marsh. The data suggest that more active flying animals (Diptera) are less apt to be inundated than animals less likely to fly (Coleoptera, Homoptera, Collembola, Hemiptera). Opinions differ as to the ability of terrestrial insects in salt marshes to escape submergence. Cameron (1972) tested the response of adult insects to submergence in several strata of salt marsh plants during different phases of exposure and submergence. He detected no differences to the animal communities that would suggest exodus or upward migration on the plants. He did not provide the taxonomic composition for his samples. Since Cameron used the clip-quadrat sampling technique, it is unlikely that adult dipterans were adequately sampled. Thus, he probably studied the less active orders of insects, such as those found in the submerged vegetation in the Oregon marshes.

The infauna of pans and tidal creeks include estuarine animals (e.g., Polychaeta, Amphipoda, Tanaidacea, Isopoda) and animals of terrestrial origin (dipterous larvae) (Table 7). Many of the taxa found in the Oregon tidal creeks also occur in Atlantic coast tidal creeks or embayments. These include *Neanthes*, *Streblospio*, *Polydora*, *Hobsonia*, Capitellidae, *Eteone*, *Corophium*, *Orchestia*, Dolichopodidae, Ephydridae, and Muscidae (Nixon and Oviatt, 1973; Cammen, 1976). The polychaete, *Hobsonia florida*, is common on the east coast and is apparently widespread in the Pacific Northwest estuaries, where it has only recently been identified (Banse, 1979). The Atlantic coast tidal creeks apparently are inhabited by a greater variety of decapods, including fiddler crabs (*Uca*), the green crab (*Carcinides maenas*), and the blue crab (*Callinectes sapidus*) (Nixon and Oviatt, 1973). Only one decapod, *Hemigrapsus oregonensis*, was found in the sedge and mature high tidal creeks, although it is possible that estuarine decapods, such as *Crangon*, *Callianassa*, and *Cancer*, occur in other Oregon tidal creeks. Molluskan diversity was also low in the Oregon tidal creeks. Only two taxa were abundant, *Alderia* and *Macoma balthica*. MacDonald (1969) found *Macoma inconspicua* (considered here to be synonomous with *M. balthica*) and *Mya arenaria* in a marsh tidal creek of Coos Bay, a southern Oregon estuary. He found these species plus *Macoma nasuta* and *Cryptomya californica* in Grays Harbour, Washington. All four species are common in the Pacific Northwest estuaries. Fewer species of tidal creek mollusks tended to occur in the Oregonian Province than in the Californian Province. These tidal creek mollusks

were not mentioned in Nixon and Oviatt (1973) or Cammen (1976), although both *Macoma balthica* and *Mya arenaria* occur in Atlantic coast estuaries.

The trophic structure of invertebrate communities in the Oregon marshes is strongly oriented to the detritus food chain. In the marsh soil, low vegetation, debris line, tidal creek substrate, and tidal flat habitats, numbers of detritivores and scavengers far exceeded the number of herbivores (Figs. 13 to 18). Only the upper vegetation sampled by sweep net contained a large proportion of herbivores, and this proportion increased from low marsh to high marsh. Herbivores were concentrated on growing plant tissues where their food resources are greatest; detritivores and scavengers were abundant in surface debris and in the soil where their food accumulates. Overall animal abundance appears to favor detritivores and scavengers and thus the detritus food chain. This is consistent with the observation that energy flow in salt marshes is greater through detritus than through grazing food chains (Teal, 1962), and that marsh plants produce surpluses of organics that are both incorporated into marsh food chains and exported to other estuarine food chains (Teal, 1962; Cameron, 1972; Eilers, 1979).

As in other studies (Davis and Gray, 1966; Cameron, 1972), spiders were found to be the dominant invertebrate carnivore in terrestrial food chains.

Few fish species were collected in the marsh habitats. Threespine stickleback, staghorn sculpin, and fewer numbers of prickly sculpin (*Cottus asper*), coastal sculpin (*C. aleuticus*), shiner surfperch, surf smelt, and chum salmon were found in the tidal creeks. In tidal creeks of marshes in the Fraser River estuary, Dunford (1975) collected juvenile chum and chinook salmon, threespine stickleback, and small numbers of prickly sculpin. In slough habitats he collected a much greater variety of fish, including juvenile salmon, starry flounder, threespine stickleback, prickly sculpin, staghorn sculpin, peamouth (*Mylocheilus caurinus*), squawfish (*Ptychocheilus oregonensis*), and several species of the minnow family (*Cyprinidae*). Although the two studies agree that fish diversity is higher in sloughs than in tidal creeks, species composition tended toward freshwater species in the Fraser River sloughs and marine species in the Siletz River slough.

Daiber (1977), working in Delaware marshes, and Shenker and Dean (1979), working in South Carolina marshes, observed high usage of Atlantic coast tidal creeks by larval and juvenile fishes. Their results emphasize the high diel and seasonal variability in catch composition. Also, while more species used creeks in the lower more marine parts of the estuary, variation in use from creek to creek was high (Daiber, 1977). A total of 22 species and 16 families of larval, juvenile, and adult fish used the South Carolina Creeks. Many of these are marine species.

Based on Dunford's (1975) study and the Oregon study, the fish fauna of marsh tidal creeks in the Pacific Northwest estuaries are low in diversity and does not include large or diverse larval and

juvenile populations. The following explanations are possible: (1) The studies did not adequately represent the fauna studies, which may vary greatly, by season, by day, and from creek to creek; (2) the low salinity regime of the estuaries studied prevented the influx of marine species; and (3) the relatively simple and spatially restricted nature of Pacific coast marshes has not encouraged extensive exploitation of the tidal creek habitats by juveniles of marine species such as has occurred on the Atlantic coast.

Dunford's (1975) study of fish communities in slough and tidal creek habitats of the Fraser River estuary provides comparative information to the Oregon study. Juvenile chum, chinook, and sockeye (*Oncorhynchus nerka*) salmon, which he collected in these habitats, consumed mostly aquatic foods. However, there appeared to be more terrestrial animals consumed in the tidal creeks than in sloughs, and more of these animals were consumed in late May than in April. The principal prey organisms were Homoptera and Collembola, although other terrestrial animals were eaten. In some incidences, terrestrial animals accounted for more than 40 percent of the prey biomass. The implication is that the young salmon fed opportunistically on available prey, which included increasing amounts of terrestrial insects as populations increased during early spring. More insects presumably wash into the marsh-lined tidal creeks than into sloughs. In other studies of northwest estuaries, juvenile salmon consumed predominantly benthic amphipods (Cliff and Stockner, 1973), harpacticoids (Healey, 1979), and a mixture of amphipods, isopods, dipterous larvae, and copepods (Mason, 1974). The diurnal variation in juvenile chum and coho (*O. kisutch*) salmon foods observed by Mason in a small coastal creek is an excellent illustration of the dietary flexibility exhibited by young salmonids.

Other fish species in the slough habitat in Dunford's (1975) study consumed mostly aquatic foods: (1) longfin smelt (*Spirinchus thaleichthys*)--mysids; (2) peamouth--cladocera and ostracods; (3) starry flounder--benthic amphipods and isopods, oligochaetes, polychaetes, and chironomid larvae; (4) prickly sculpin--benthic isopods, chironomid and tabanid larvae, and benthic amphipods; (5) staghorn sculpin--benthic amphipods and isopods, and juvenile salmon; and (6) threespine stickleback--chironomid larvae, oligochaetes, benthic amphipods tabanid larvae, copepods, cladocerans, and terrestrial insects. In the tidal creek, threespine stickleback ate copepods and amphipods, and prickly sculpin ate mostly benthic isopods and amphipods.

In Siletz and Netarts Bays, small amounts of terrestrial invertebrates were consumed by fish collected in marsh habitats, and an adjoining slough, and in bay channels. Amphipods, isopods, tanaids, polychaetes, cumaceans, copepods, dipterous larvae and pupae, and fish were the dominant food items. Thus, it appears that energy flows into the aquatic communities primarily through the detrital

pathway, where it is augmented by inputs from benthic and planktonic primary producers. This conclusion is consistent with the results of Teal (1962), Odum and Heald (1975), and similar studies of estuarine food chains.

VI. CONCLUSIONS

The structure and trophic relations of fish and invertebrate communities were studied in several marsh and estuarine habitats of Siletz and Netarts bays, Oregon. These marshes do not appear to directly play a dominant role in aquatic food chains of these estuaries. Fish diversity was low in marsh habitats (tidal creek, pan, slough, and submerged level marsh), although juvenile chum salmon, staghorn sculpin, and threespine stickleback were occasionally abundant. In other Pacific Northwest marshes, several freshwater species plus additional species of juvenile Pacific salmon occur. Fish in the Oregon marshes consumed minor amounts of terrestrial foods in comparison to aquatic foods. Only juvenile chum salmon feeding over submerged level marshes consumed substantial amounts of terrestrial insects and spiders. In general, these marshes apparently do not form a nursery area for a high diversity of marine species as occurs in Atlantic coast marshes. The paucity of marine species may relate to low salinity or to a lack of extensive marsh aquatic habitats.

Detritivores dominated the food chains in most of the Oregon marsh habitats, although herbivores were dominant in the upper vegetation of high marshes. This overall emphasis of detritus-based food chains coincides with conclusions based on studies of Atlantic coast marshes. The study of Oregon marshes indicates that many invertebrate taxa are common to both Atlantic and Pacific coast marshes, and that there is a tendency among the marshes for similar taxa to be numerically dominant. However, enough differences exist in invertebrate and especially fish communities to suggest that assessments of the trophic value of western marshes should be based on direct study of these marshes rather than on inferences made from marshes located elsewhere.

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APPENDIX A

CRITIQUE OF METHODS

An adequate study of faunal seasonality requires site-intensive study with summer sampling at 1- or 2-week intervals, a schedule beyond the resources of this study. Travel among the study areas was time-consuming and the number of habitats under study was large. These factors combined with weather and tidal patterns to prevent an adequate study of seasonality. In retrospect, effort should have been concentrated in fewer visits so that the survey aspects could have been emphasized and thus provide a more evenly distributed data base covering the various habitats.

Of the sampling methods used, only the corer samples provided quantitative estimates of animal abundance. The enclosure and clip-quadrat samples were semiquantitative; terrestrial sweep net, drift net, seine, and aquatic sweep net samples provided estimates of relative abundance. Because of these varying characteristics, comparisons among habitats and samplers have necessarily emphasized relative rather than absolute abundance. The large enclosure method could be made more quantitative by using a device which severs the enclosed vegetation, which could then be rinsed in a dilute formalin solution to remove attached animal life. This method, as with the one used here, does not account for organisms such as oligochaetes and insects which live within living and dead plant tissues and are likely important factors in detrital and grazing food chains. The enclosure apparently could be smaller than the 1-meter diameter used, since sample counts in some cases exceeded several thousand for dominant species. However, this decision should consider the fact that sample counts varied greatly according to season and site.

Based on the low sample counts obtained for level marsh infauna, a larger sampler than the 918-centimeter-diameter corer used would be desirable, although core depths apparently can be limited to about 5 centimeters. This assumes first that the study of this fauna is warranted, and second that an efficient method for separating animals from the soil is available. The silty soils of Siletz Bay were compacted and root-bound and thus resistant to simple methods of animal extraction such as provided by the Berlese funnel. The mostly sandy and peaty nature of soils at Netarts study sites likely would have allowed use of the Berlese funnel, although such use would have created differences of methodology between the two bays. Other methods tend to be time-consuming, arduous, or selective for certain taxa, and also may require special washing racks (Edwards, Dukes, and Axtell, 1974; Kline, Dukes, and Axtell, 1975).

Measurements of invertebrate drift in tidal channels were non-quantitative principally because water speeds were too low to operate the net flow meter (General Oceanics Model 2030). Use of a more sensitive meter or direct measurement of waterflow rate appears necessary if drift is to be quantified. Quantification of fish populations in tidal creeks apparently can be approached through use of nets described by Shenker and Dean (1979).

APPENDIX B

TAXONOMIC LIST OF INVERTEBRATES

Phylum Protozoa
- Subphylum Sarcomastigophora
  - Class Rhizopodea
    - Order Foraminifera

Phylum Cnidaria
- Class Anthozoa
  - Subclass Zoantharia
    - Order Actinaria
      - *Halacampa* (?) sp.

Phylum Platyhelminthes
- Class Turbellaria
- Class Trematoda

Phylum Nemertea

Phylum Nematoda

Phylum Annelida
- Class Polychaeta
  - Order Orbiniida
    - Family Orbiniidae
      - *Haploscoloplos* sp.
  - Order Spinoida
    - Family Spionidae
      - *Polydora* sp.
      - *Pseudopolydora* sp.
      - *Pygospio* sp.
      - *Streblospio* sp.
  - Order Capitellida
    - Family Capitellidae
  - Order Phyllodocida
    - Family Glyceridae
      - *Glycera* sp.
    - Family Nereidae
      - *Neanthes limnicola*
    - Family Phyllodocidae
      - *Eteone* sp.
  - Order Eunicida
    - Family Arabellidae
  - Order Terebellida
    - Family Ampharetidae
      - *Hobsonia florida*
    - Family Terebellidae
      - *Amaeana* sp.
  - Order Sabellida
    - Family Spirorbidae
- Class Oligochaeta

Phylum Mollusca
- Class Gastropoda
  - Subclass Opisthobranchia
    - Order Sacoglossa
      - *Alderia* (?) sp.
- Class Bivalvia
  - Order Myoida
    - Family Myidae
      - *Cryptomya californica*
  - Order Veneroida
    - Family Tellenidae
      - *Macoma balthica*

Phylum Arthropoda
- Subphylum Chelicerata
  - Class Arachnida
    - Order Pseudoscorpiones
    - Order Aranae
    - Order Acarina
- Subphylum Mandibulata
  - Class Crustacea
    - Subclass Branchiopoda
      - Order Diplostraca
        - Suborder Cladocera
          - Family Polyphemidae
            - *Podon* sp.
            - *Evadne* sp.
    - Subclass Ostracoda
    - Subclass Copepoda
      - Order Calanoida
      - Order Cyclopoida
      - Order Harpacticoida
    - Subclass Cirripedia
      - Order Thoracica
        - Suborder Balanomorpha
          - Family Balanidae
    - Subclass Malacostraca
      - Superorder Peracarida
        - Order Mysidacea
          - Family Mysidae
            - *Neomysis mercedis*
        - Order Cumacea
          - Family Nannastacidae
            - *Cumella* sp.
          - Family Hemileuconidae
            - *Hemileucon* sp.
        - Order Tanaidacea
          - Family Tanaidae
            - *Pancolus* sp.
          - Family Paratanaidae
            - *Leptochelia* sp.
        - Order Isopoda
          - Suborder Flabellifera
            - Family Sphaeromatidae
              - *Gnorimosphaeroma lutea*
          - Suborder Valvifera
            - Family Idoteidae
              - *Idotea fewkesi*
              - *Idotea resecata*
          - Suborder Oniscoidea
            - Family Ligiidae
              - *Ligidium gracilis*
            - Family Oniscidae
              - *Porcellio scaber*
        - Order Amphipoda
          - Suborder Gammaridea
            - Family Ampithoidae
              - *Ampithoe* sp.
            - Family Corophiidae
              - *Corophium* sp.
            - Family Gammaridae
              - *Anisogammarus confervicolus*
            - Family Haustoriidae
              - *Eohaustorius* sp.
            - Family Phoxocephalidae
              - *Paraphoxus* sp.
            - Family Talitridae
              - *Orchestia traskiana*
          - Suborder Caprellidea
            - Family Caprellidae
      - Superorder Eucarida
        - Order Decapoda
          - Suborder Natantia
            - Family Crangonidae
              - *Crangon franciscorum*
              - *Crangon nigricauda*
            - Family Pandalidae
              - *Pandalus danae*
          - Suborder Reptantia
            - Family Callianassidae
            - Family Paguridae
            - Family Cancridae
              - *Cancer magister*
              - *Cancer productus*
            - Family Grapsidae
              - *Hemigrapsus oregonensis*
            - Family Majidae
              - *Pugettia producta*

Class Insecta
- Subclass Apterygota
  - Order Collembola
    - Family Entomobryidae
    - Family Isotomidae
    - Family Onychiuridae
    - Family Poduridae
    - Family Sminthuridae
  - Order Diplura
  - Order Odonata
    - Suborder Anisoptera
  - Order Orthoptera
  - Order Thysanoptera
  - Order Hemiptera
    - Suborder Amphibicorizae
      - Family Saldidae
    - Suborder Geocorizae
      - Family Lygaeidae
      - Family Miridae
      - Family Pentatomidae

Suborder Hydrocorizae
Family Corixidae
Order Homoptera
Suborder Auchenorrhyncha
Family Cercopidae
Family Cicadellidae
Family Delphacidae
Suborder Sternorrhyncha
Family Aphididae
Order Coleoptera
Suborder Adephaga
Family Carabidae
Suborder Polyphaga
Family Hydrophilidae
Family Limnebiidae
Family Staphylinidae
Family Silphidae
Family Pselaphidae
Family Ptiliidae
Family Heteroceridae
Family Coccinellidae
Family Corylophidae
Family Chrysomelidae
Order Trichoptera
Family Limnephilidae
Order Lepidoptera
Suborder Frenatae
Family Pyralidae
Order Diptera
Suborder Nematocera
Family Tipulidae
Family Psychodidae
Family Ceratopogonidae
Family Chironomidae
Family Culicidae
Family Mycetophilidae
Family Scatopsidae
Family Sciaridae
Family Cecidomyiidae
Family Stratiomyidae
Family Tabanidae
Family Dolichopodidae
Suborder Cyclorrhapha
Family Longchopteridae
Family Phoridae
Family Syrphidae
Family Sepsidae
Family Sciomyzidae
Family Sphaeroceridae
Family Ephydridae
Family Chloropidae
Family Muscidae
Order Hymenoptera
Suborder Apocrita
Family Formicidae

Class Chilopoda
Class Diplopoda
Phylum Echinodermata
Class Stelleroidea
Subclass Asteroidea
Order Forcipulatida
Leptasterias hexactis

APPENDIX C

TAXANOMIC LIST OF FISH

Family	Scientific Name	Common Name
Ammodytidae	*Ammodytes hexapterus*	Pacific Sandlance
Atherinidae	*Atherinops affinis*	Topsmelt
Bothidae	*Citharichthys stigmaeus*	Speckled Sanddab
Cottidae	*Leptocottus armatus*	Staghorn Sculpin
Cottidae	*Enophrys bison*	Buffalo Sculpin
Cottidae	*Scorpaenichthys marmoratus*	Cabezon
Cottidae	*Cottus asper*	Prickly Sculpin
Cottidae	*Cottus aleuticus*	Coastal Sculpin
Embiotocidae	*Cymatogaster aggregata*	Shiner Surfperch
Embiotocidae	*Phanerodon furcatus*	White Surfperch
Engraulidadae	*Engraulis mordax*	Northern Anchovy
Gadidae	*Microgadus proximus*	Pacific Tomcod
Gasterosteidae	*Aulorhynchus flavidus*	Tubesnout
Gasterosteidae	*Gasterosteus aculeatus*	Threespine Stickleback
Hexagrammidae	*Ophiodon elongatus*	Lingcod
Hexagrammidae	*Hexagrammos decagrammus*	Kelp Greenling
Osmeridae	*Hypomesus pretiosus*	Surf Smelt
Pholidae	*Pholis ornata*	Saddleback Gunnel
Pleuronectidae	*Platichthys stellatus*	Starry Flounder
Pleuronectidae	*Parophrys vetulus*	English Sole
Pleuronectidae	*Psettichthys melanostictus*	Sand Sole
Salmonidae	*Oncorhynchus keta*	Chum Salmon
Salmonidae	*Oncorhynchus tshawytscha*	Chinook Salmon
Salmonidae	*Salmo gairdnerii*	Steelhead Trout
Scorpaenidae	*Sebastes spp*	Rockfish spp
Stichaetidae	*Lumpenus sagitta*	Snake Prickleback
Syngnathidae	*Syngnathus leptorhynchus*	Bay Pipefish

APPENDIX D

INVERTEBRATE SAMPLE DATA

Abbreviations used for gear in this appendix are

AN = aquatic sweep net
CQ = clip-quadrat
LC = large corer
LD = large drift net
LE = large enclosure
MC = medium corer
SC = small corer
SD = small drift net
SE = small enclosure
TN = terrestrial sweep net

Table D-1. Density (number per square meter) of infauna captured by MC in the exposed level marsh of the low sand area, 7 February 1978. The samples were 20 centimeters deep.

AREA		L SAND	L SAND	L SAND	L SAND	
SAMPLER		MC	MC	MC	MC	
SITE		01	01	01	01	
SAMPLE		0015	0023	0048	0075	MEAN(SD)
TAXON	LIFE STAGE					
INVERTEBRATES						
POLYCHAETA						
AMPHARETIDAE SPP	ADULTS	123				30.8(53.4)
OLIGOCHAETA						
OLIGOCHAETA SPP	ADULTS	370	2960	2220	2467	2004.4(980.5)
GASTROPODA						
GASTROPODA SPP	ADULTS		247	370		154.2(160.2)
ARANEAE						
ARANEAE SPP	ADULTS		247	123		92.5(102.3)
ACARINA						
ACARINA SPP	ADULTS	4317	2837	6908	247	3577.2(2412.4)
CUMACEA						
CUMELLA SPP	ADULTS		123		740	215.9(306.8)
AMPHIPODA					2097	524.2(908.0)
COROPHIUM SPP	ADULTS					30.8(53.4)
GAMMARIDEA SPP	ADULTS		123			246.7(427.3)
ANISOGAMMARUS CONFERVICOLUS	ADULTS				987	61.7(106.8)
TALITRIDAE SPP	ADULTS			247		30.8(53.4)
AMPITHOE SPP	ADULTS				123	400.9(694.4)
ORCHESTIA TRASKIANA	ADULTS				1604	
COLEOPTERA						
LIMNEBIIDAE SPP	ADULTS	123	123	1110		339.2(447.9)
DIPTERA						
DOLICHOPODIDAE SPP	LARVAE			493		123.3(213.6)
CERATOPOGONIDAE SPP	LARVAE	123	2344	20353		5704.9(8508.2)
CHIRONOMIDAE SPP	LARVAE	4687	8511	1234	54521	17238.2(21673.5)
TIPULIDAE SPP	LARVAE		1604	987		647.6(683.3)
	TOTAL	9743	19119	34045	62786	

Table D-2. Density (number per square meter) of infauna captured by MC in the exposed level marsh of the low silt area, 6 February 1978. The samples were 20 centimeters deep.

AREA		L SILT	L SILT	L SILT	L SILT	
SAMPLER		MC	MC	MC	MC	
SITE		01	01	01	01	
SAMPLE		0000	0023	0090	0053	MEAN(SD)
TAXON	LIFE STAGE					
INVERTEBRATES						
CNIDARIA						
CNIDARIA SPP	ADULTS	247	247			123.3(123.3)
NEMATODA						
NEMATODA SPP	ADULTS			247	123	92.5(102.3)
POLYCHAETA						
CAPITELLIDAE SPP	ADULTS	123				30.8(53.4)
MAGELONIA FLORIDA	ADULTS		740			185.0(320.5)
OLIGOCHAETA						
OLIGOCHAETA SPP	ADULTS	4317	987	14185	2467	5489.1(5157.5)
ISOPODA						
GNORIMOSPHAEROMA LUTEA	ADULTS			123	2960	770.9(1265.1)
AMPHIPODA				123		30.8(53.4)
AMPHIPODA SPP	ADULTS	4194	34661	1480	740	10268.9(14141.6)
CORCPHIUM SPP	ADULTS	2344	2344	123		1202.7(1141.8)
ANISOGAMMARUS CONFERVICOLUS	ADULTS					
INSECTA						
INSECTA SPP	NYMPHS	247				61.7(106.8)
DIPTERA					123	30.8(53.4)
MUSCIDAE SPP	LARVAE			123	123	92.5(53.4)
DOLICHOPODIDAE SPP	LARVAE	123		2837	123	7008.1(8646.1)
CERATOPOGONIDAE SPP	LARVAE	21833	3207		123	30.8(53.4)
CHIRONOMIDAE SPP	LARVAE			247		61.7(106.8)
PSYCHODIDAE SPP	LARVAE				1357	339.2(567.5)
TIPULIDAE SPP	LARVAE					
	TOTAL	33428	42186	19468	8139	

Table D-3. Density (number per square meter) of infauna captured by MC in the exposed level marsh of the sedge area, 6 February 1978. The samples were 20 centimeters deep.

AREA		SEDGE	SEDGE	SEDGE	SEDGE	
SAMPLER		MC	MC	MC	MC	
SITE		01	01	01	01	
SAMPLE		0048	0051	0061	0089	
TAXON	LIFE STAGE					MEAN(SD)
INVERTEBRATES						
NEMATODA						
NEMATODA SPP	ADULTS	863		493		339.2(363.6)
OLIGOCHAETA						
OLIGOCHAETA SPP	ADULTS	2344	3577	2837	3084	2960.4(444.7)
ACARINA						
ACARINA SPP	ADULTS	493			370	215.9(220.2)
CIRRIPEDIA						
BALANIDAE SPP	ADULTS				123	30.8(53.4)
CUMACEA						
MEMILEUCON SPP	ADULTS	1604	370			493.4(654.5)
CUMELLA SPP	ADULTS				123	30.8(53.4)
ISOPODA						
GNORIMOSPHAEROMA LUTEA	ADULTS	987	123	370	863	585.9(353.0)
AMPHIPODA						
CORPHIUM SPP	ADULTS	1604			247	462.6(666.4)
ANISOGAMMARUS CONFERVICOLUS	ADULTS	370	740		123	308.4(282.6)
TRICHOPTERA						
LIMNEPHILIDAE SPP	LARVAE				123	30.8(53.4)
DIPTERA						
EPHYDRIDAE SPP	LARVAE				123	30.8(53.4)
MUSCIDAE SPP	LARVAE			247		61.7(106.8)
CHIRONOMIDAE SPP	LARVAE		247		123	92.5(102.3)
CERATOPOGONIDAE SPP	LARVAE	8264	4811	2220	1113	4101.4(2753.2)
CHIRONOMIDAE SPP	LARVAE	123				30.8(53.4)
TIPULIDAE SPP	LARVAE			740		185.0(320.5)
	TOTAL	16652	9868	6907	6412	

Table D-4. Density (number per square meter) of infauna captured by MC in the exposed level marsh of the immature high area, 7 February 1978. The samples were 20 centimeters deep.

AREA		IM HI	IM HI	IM HI	IM HI	
SAMPLER		MC	MC	MC	MC	
SITE		01	01	01	01	
SAMPLE		0050	0083	0095	0097	
TAXON	LIFE STAGE					MEAN(SD)
INVERTEBRATES						
TURBELLARIA						
TURBELLARIA SPP	ADULTS	1357				339.2(587.5)
NEMATODA						
NEMATODA SPP	ADULTS				123	30.8(53.4)
OLIGOCHAETA						
OLIGOCHAETA SPP	ADULTS	3207	4194	2960	7771	4533.1(1925.6)
ARTHROPODA						
ARTHROPODA SPP	UNSPECIFIED		123		123	61.7(61.7)
ARANEAE						
ARANEAE SPP	ADULTS	123	123		123	92.5(53.4)
ACARINA						
ACARINA SPP	ADULTS		370			92.5(160.2)
ISOPODA						
FOSSELLIO SCADER	ADULTS		123			30.8(53.4)
LIVIDIUM GRACILIS	ADULTS				123	30.8(53.4)
AMPHIPODA						
ORCHESTIA TRASKIANA	ADULTS				123	30.8(53.4)
INSECTA						
INSECTA SPP	LARVAE				247	61.7(106.8)
HOMOPTERA						
HOMOPTERA SPP	ADULTS		123			30.8(53.4)
COLEOPTERA						
COLEOPTERA SPP	LARVAE		493		493	246.7(246.7)
DIPTERA						
DIPTERA SPP	PUPAE		123		123	61.7(61.7)
DIPTERA SPP	LARVAE		493		247	185.0(204.6)
CHIRONOMIDAE SPP	LARVAE	247	740	123	617	431.7(254.3)
CERATOPOGONIDAE SPP	LARVAE		247		247	123.3(121.3)
CHIRONOMIDAE SPP	LARVAE	123	1110	370	1727	832.6(631.2)
MYCETOPHILIDAE SPP	LARVAE		247	493		185.0(204.6)
HEMENOPTERA						
HEMENOPTERA SPP	LARVAE		123			30.8(53.4)
CHILOPODA						
CHILOPODA SPP	ADULTS		247			61.7(106.8)
	TOTAL	5057	8875	3946	12087	

Table D-5. Density (number per square meter) of infauna captured by MC in the exposed level marsh of the mature high area, 7 April 1978. The samples were 5 to 7 centimeters deep.

AREA		MAT HI	MAT HI	MAT HI	MAT HI		
SAMPLER		MC	MC	MC	MC		
SITE		01	01	01	01		
SAMPLE		0009	0023	0071	0092		
TAXON	LIFE STAGE					MEAN	(SD)
INVERTEBRATES							
OLIGOCHAETA							
OLIGOCHAETA SPP	ADULTS	2960	617		247	956.0	(1177.9)
ARANEAE							
ARANEAE SPP	ADULTS	493	493	123	987	524.2	(306.8)
ACARINA							
ACARINA SPP	ADULTS		493	863	493	462.6	(306.8)
ISOPODA							
LIGIDIUM GRACILIS	ADULTS	247		247	740	308.4	(268.8)
COLEOPTERA							
STAPHYLINIDAE SPP	ADULTS			247		61.7	(106.8)
DIPTERA							
DIPTERA SPP	PUPAE	247	493	617	123	370.0	(195.0)
DIPTERA SPP	LARVAE				123	30.8	(53.4)
DOLICHOPODIDAE SPP	LARVAE	370	493	987	1357	801.8	(396.9)
CERATOPOGONIDAE SPP	LARVAE		740	247	863	462.6	(353.0)
CHIRONOMIDAE SPP	LARVAE		493	123	617	308.4	(254.3)
TIPULIDAE SPP	LARVAE		247			61.7	(106.8)
MYCETOPHILIDAE SPP	LARVAE	493	987	247	370	524.2	(280.9)
HYMENOPTERA							
FORMICIDAE SPP	ADULTS			123		30.8	(53.4)
DIPLOPODA							
DIPLOPODA SPP	ADULTS				123	30.8	(53.4)
	TOTAL	4810	5056	3824	6043		

Table D-6. Density (number per square meter) of animals captured by CQ in the exposed level marsh of the low sand area, 29 August 1978.

AREA		L SAND	L SAND	L SAND	L SAND		
SAMPLER		CQ	CQ	CQ	CQ		
SITE		10	10	10	10		
SAMPLE		0001	0002	0003	0004		
TAXON	LIFE STAGE					MEAN	(SD)
INVERTEBRATES							
ARANEAE							
ARANEAE SPP	ADULTS		16	16		8.0	(8.0)
ACARINA							
ACARINA SPP	ADULTS	144	656	496	528	456.0	(189.8)
AMPHIPODA							
AMPHIPODA SPP	ADULTS				16	4.0	(6.9)
DIPLURA							
DIPLURA SPP	ADULTS		16	48		16.0	(19.6)
THYSANOPTERA							
THYSANOPTERA SPP	ADULTS			16		4.0	(6.9)
COLEOPTERA							
COLEOPTERA SPP	ADULTS		48			12.0	(20.8)
CARABIDAE SPP	ADULTS	16				4.0	(6.9)
LIMNEBIIDAE SPP	ADULTS	32			80	28.0	(32.7)
DIPTERA							
CERATOPOGONIDAE SPP	ADULTS		16			4.0	(6.9)
CHIRONOMIDAE SPP	ADULTS			16		4.0	(6.9)
	TOTAL	192	752	592	624		

Table D-7. Density (number per square meter) of animals captured by CQ in the exposed level marsh of the low silt area, 7 September 1978.

AREA		L SILT	L SILT	L SILT	L SILT	
SAMPLER		CQ	CQ	CQ	CQ	
SITE		13	13	13	13	
SAMPLE		0001	0002	0003	0004	
TAXON	LIFE STAGE					MEAN(SD)
INVERTEBRATES						
ARANEAE						
ARANEAE SPP	ADULTS	32			16	12.0(13.3)
ACARINA						
ACARINA SPP	ADULTS	496	848	1744	1264	1088.0(466.2)
ISOPODA						
ISOPODA SPP	ADULTS	48	128	416	288	220.0(142.4)
HEMIPTERA						
SALDIDAE SPP	NYMPHS		16			4.0(6.9)
HOMOPTERA						
DELPHACIDAE SPP	ADULTS			16	16	8.0(8.0)
APHIDIDAE SPP	ADULTS	48	224	480	64	204.0(173.6)
HYMENOPTERA						
HYMENOPTERA SPP	ADULTS		48	16	64	32.0(25.3)
	TOTAL	624	1264	2672	1712	

Table D-8. Density (number per square meter) of animals captured by CQ in the exposed level marsh of the sedge area, 7 September 1978.

AREA		SEDGE	SEDGE	SEDGE	SEDGE	
SAMPLER		CQ	CQ	CQ	CQ	
SITE		13	13	13	13	
SAMPLE		0001	0002	0003	0004	
TAXON	LIFE STAGE					MEAN(SD)
INVERTEBRATES						
ARANEAE						
ARANEAE SPP	ADULTS	48	32			20.0(20.8)
ACARINA						
ACARINA SPP	ADULTS	5184	3024	2240	4672	3780.0(1194.8)
CIRRIPEDIA						
CIRRIPEDIA SPP	ADULTS				320	80.0(138.6)
AMPHIPODA						
AMPHIPODA SPP	ADULTS	32	112	16		40.0(43.1)
THYSANOPTERA						
THYSANOPTERA SPP	ADULTS				64	16.0(27.7)
HOMOPTERA						
DELPHACIDAE SPP	ADULTS	16				4.0(6.9)
APHIDIDAE SPP	ADULTS	16	16		16	12.0(6.9)
DIPTERA						
SCIARIDAE SPP	ADULTS		32		16	12.0(13.3)
HYMENOPTERA						
HYMENOPTERA SPP	ADULTS			32		8.0(13.9)
	TOTAL	5296	3216	2288	5088	

Table D-9. Density (number per square meter) of animals captured by CQ in the exposed level marsh of the immature high area, 29 August 1978.

AREA		IM HI	IM HI	IM HI	IM HI		
SAMPLER		CQ	CQ	CQ	CQ		
SITE		10	10	10	10		
SAMPLE		0001	0002	0003	0004		
TAXON	LIFE STAGE					MEAN	(SD)
INVERTEBRATES							
ARANEAE							
ARANEAE SPP	ADULTS	32	96		64	48.0(	35.8)
ACARINA							
ACARINA SPP	ADULTS	912	2848	880	2160	1700.0(	840.1)
ISOPODA							
ISOPODA SPP	ADULTS	16	64		32	28.0(	23.7)
COLLEMBOLA							
SMINTHURIDAE SPP	ADULTS	80	160	16	128	96.0(	54.3)
ISOTOMIDAE SPP	ADULTS	560	696	80	1248	636.0(	415.3)
ENTOMOBRYIDAE SPP	ADULTS		320		48	92.0(	133.1)
PODURIDAE SPP	ADULTS	32				8.0(	13.9)
THYSANOPTERA							
THYSANOPTERA SPP	ADULTS	48	16			16.0(	19.6)
HEMIPTERA							
HEMIPTERA SPP	ADULTS			16		4.0(	6.9)
HOMOPTERA							
DELPHACIDAE SPP	ADULTS		48	48		24.0(	24.0)
APHIDIDAE SPP	ADULTS	16	32		16	16.0(	11.3)
COLEOPTERA							
COLEOPTERA SPP	ADULTS	16			48	16.0(	19.6)
STAPHYLINIDAE SPP	ADULTS				16	4.0(	6.9)
PSELAPHIDAE SPP	ADULTS			16		4.0(	6.9)
LIMNEBIIDAE SPP	ADULTS			16	64	20.0(	26.2)
PTILIIDAE SPP	ADULTS		16	32	32	20.0(	13.3)
CORYLOPHIDAE SPP	ADULTS				16	4.0(	6.9)
HETEROCERIDAE SPP	ADULTS				48	12.0(	20.8)
HYMENOPTERA							
HYMENOPTERA SPP	ADULTS		16			4.0(	6.9)
	TOTAL	1712	4272	1104	3920		

Table D-10. Density (number per square meter) of animals captured by CQ in the exposed level marsh of the mature high area, 25 September 1978.

AREA		MAT HI	MAT HI	MAT HI	MAT HI		
SAMPLER		CQ	CQ	CQ	CQ		
SITE		10	10	10	10		
SAMPLE		0001	0002	0003	0004		
TAXON	LIFE STAGE					MEAN	(SD)
INVERTEBRATES							
ARANEAE							
ARANEAE SPP	ADULTS	144	144	128	80	124.0(	26.2)
ACARINA							
ACARINA SPP	ADULTS	592	3696	2496	3808	2648.0(	1293.7)
ISOPODA							
ISOPODA SPP	ADULTS		16			4.0(	6.9)
AMPHIPODA							
AMPHIPODA SPP	ADULTS				16	4.0(	6.9)
COLLEMBOLA							
SMINTHURIDAE SPP	ADULTS		80	112	112	76.0(	45.8)
ISOTOMIDAE SPP	ADULTS	816	848	1840	2352	1464.0(	657.5)
PODURIDAE SPP	ADULTS		112	32	608	188.0(	245.9)
THYSANOPTERA							
THYSANOPTERA SPP	ADULTS		64	112	96	68.0(	42.9)
HOMOPTERA							
DELPHACIDAE SPP	ADULTS		16	32		12.0(	13.3)
APHIDIDAE SPP	ADULTS	16	48	112	560	184.0(	219.8)
COLEOPTERA							
STAPHYLINIDAE SPP	ADULTS			16		4.0(	6.9)
PSELAPHIDAE SPP	ADULTS	16	16			8.0(	8.0)
CARABIDAE SPP	ADULTS				16	4.0(	6.9)
LIMNEBIIDAE SPP	ADULTS	32	16	16		16.0(	11.3)
PTILIIDAE SPP	ADULTS	32	48	16	16	28.0(	13.3)
CORYLOPHIDAE SPP	ADULTS		128	48	16	48.0(	49.3)
LEPIDOPTERA							
LEPIDOPTERA SPP	ADULTS				32	8.0(	13.9)
DIPTERA							
CHIRONOMIDAE SPP	ADULTS		16	128	16	40.0(	51.2)
PSYCHODIDAE SPP	ADULTS	16				4.0(	6.9)
HYMENOPTERA							
HYMENOPTERA SPP	ADULTS		16		16	8.0(	8.0)
	TOTAL	1664	5264	5088	7744		

Table D-11. Number of animals captured in standardized TN collections (nonquantitative) in the exposed level marsh vegetation of the low sand area, 29 August 1978.

AREA		L SAND	L SAND	L SAND	L SAND		
SAMPLER		TN	TN	TN	TN		
SITE		10	10	10	10		
SAMPLE		0001	0002	0003	0004		
TAXON	LIFE STAGE					MEAN	(SD)
INVERTEBRATES							
ARANEAE							
ARANEAE SPP	ADULTS	1	1		1	.8	(.4)
ACARINA							
ACARINA SPP	ADULTS	29	43	40	10	30.5	(12.9)
THYSANOPTERA							
THYSANOPTERA SPP	ADULTS		1	1		.5	(.5)
HEMIPTERA							
SALDIDAE SPP	NYMPHS	2		2		1.0	(1.0)
SALDIDAE SPP	ADULTS	1	1	1		.8	(.4)
HOMOPTERA							
CERCOPIDAE SPP	ADULTS				1	.3	(.4)
CICADELLIDAE SPP	ADULTS	18		9	11	9.5	(6.4)
COLEOPTERA							
COLEOPTERA SPP	ADULTS		1		1	.5	(.5)
COCCINELLIDAE SPP	ADULTS		1			.3	(.4)
LIMNEBIIDAE SPP	ADULTS	1		1	2	1.0	(.7)
DIPTERA							
DIPTERA SPP	ADULTS			1		.3	(.4)
EPHYDRIDAE SPP	ADULTS	8	16	11	2	9.3	(5.1)
MUSCIDAE SPP	ADULTS	59	31	18	13	30.3	(17.9)
OOLICHOPODIDAE SPP	ADULTS	1		1		.5	(.5)
SPHAEROCERIDAE SPP	ADULTS		2	4		1.5	(1.7)
SYMPHIDAE SPP	ADULTS			1		.3	(.4)
HYMENOPTERA							
HYMENOPTERA SPP	ADULTS	9	3	5	3	5.0	(2.4)
	TOTAL	129	100	95	44		

Table D-12. Number of animals captured in standardized TN collections (nonquantitative) in the exposed level marsh vegetation of the low silt area, 7 September 1978.

AREA		L SILT	L SILT	L SILT	L SILT		
SAMPLER		TN	TN	TN	TN		
SITE		13	13	13	13		
SAMPLE		0001	0002	0003	0004		
TAXON	LIFE STAGE					MEAN	(SD)
INVERTEBRATES							
ARANEAE							
ARANEAE SPP	ADULTS	118	32	31	71	63.0	(35.6)
ACARINA							
ACARINA SPP	ADULTS	1016	392	538	726	668.0	(233.2)
ISOPODA							
ISOPODA SPP	ADULTS			2		.5	(.9)
AMPHIPODA							
AMPHIPODA SPP	ADULTS			6		1.5	(2.6)
THYSANOPTERA							
THYSANOPTERA SPP	ADULTS	5		2		1.8	(2.0)
HEMIPTERA							
HEMIPTERA SPP	UNSPECIFIED	3			1	1.0	(1.2)
HEMIPTERA SPP	ADULTS	7	4	1	5	4.3	(2.2)
PENTATOMIDAE SPP	UNSPECIFIED	3			2	1.3	(1.3)
PENTATOMIDAE SPP	ADULTS	3				.8	(1.5)
SALDIDAE SPP	NYMPHS	18		2	15	8.8	(7.9)
SALDIDAE SPP	ADULTS	17	6		11	8.3	(6.3)
LYGAEIDAE SPP	ADULTS		2	1	9	3.0	(3.5)
HOMOPTERA							
DELPHACIDAE SPP	ADULTS	317	152	186	214	217.3	(61.6)
APHIDIDAE SPP	ADULTS	338	225	452	477	373.0	(100.2)
COLEOPTERA							
COCCINELLIDAE SPP	ADULTS	2	1	1	4	2.0	(1.2)
DIPTERA							
DIPTERA SPP	ADULTS	3	2	8	4	4.3	(2.3)
EPHYDRIDAE SPP	ADULTS	2			4	1.5	(1.7)
MUSCIDAE SPP	ADULTS	16			13	7.3	(7.3)
OOLICHOPODIDAE SPP	ADULTS	3			5	2.0	(2.1)
CERATOPOGONIDAE SPP	ADULTS	22	8	17	18	16.3	(5.1)
CHIRONOMIDAE SPP	ADULTS	5		6	7	4.5	(2.7)
PSYCHODIDAE SPP	ADULTS	5	3	5	12	6.3	(3.4)
CULICIDAE SPP	ADULTS	1		2	1	1.0	(.7)
CHLOROPIDAE SPP	ADULTS	4	2		5	2.8	(1.9)
HYMENOPTERA							
HYMENOPTERA SPP	ADULTS	53	39	28	26	36.5	(10.7)
	TOTAL	1561	868	1288	1630		

Table D-13. Number of animals captured in standardized TN collections (nonquantitative) in the exposed level marsh vegetation of the sedge area, 7 September 1978.

AREA		SEDGE TN	SEDGE TN	SEDGE TN	SEDGE TN		
SAMPLER							
SITE		13	13	13	13		
SAMPLE		0001	0002	0003	0004		
TAXON	LIFE STAGE					MEAN(SD)	
INVERTEBRATES							
ARANEAE							
ARANEAE SPP	ADULTS	120	72	46	94	83.0(	27.3)
ACARINA							
ACARINA SPP	ADULTS	220	570	456	795	510.3(	207.3)
THYSANOPTERA							
THYSANOPTERA SPP	ADULTS		2	6	1	2.3(	2.3)
HEMIPTERA							
SALDIDAE SPP	NYMPHS	2		1		.8(	.8)
MIRIDAE SPP	UNSPECIFIED			1	1	.5(	.5)
MIRIDAE SPP	ADULTS			1		.3(	.4)
HOMOPTERA							
DELPHACIDAE SPP	ADULTS	424	299	215	350	322.0(	76.1)
CICADELLIDAE SPP	ADULTS	2	3	8	4	4.3(	2.3)
APHIDIDAE SPP	ADULTS	1	2	1	1	1.3(	.4)
COLEOPTERA							
COCCINELLIDAE SPP	ADULTS	1			1	.5(	.5)
CARABIDAE SPP	ADULTS	1				.3(	.4)
DIPTERA							
DIPTERA SPP	ADULTS	5	9		1	3.8(	3.6)
EPHYDRIDAE SPP	ADULTS	11	5	1	10	6.8(	4.9)
MUSCIDAE SPP	ADULTS	34	9	2	15	15.0(	11.9)
DOLICHOPODIDAE SPP	ADULTS	3				.8(	1.3)
CERATOPOGONIDAE SPP	ADULTS	3	2	6	2	3.3(	1.6)
PSYCHODIDAE SPP	ADULTS	6	2	2	6	3.5(	1.7)
CULICIDAE SPP	ADULTS	2			1	.8(	.8)
SPHAEROCERIDAE SPP	ADULTS	5			1	1.5(	2.1)
TIPULIDAE SPP	ADULTS	3				.8(	1.3)
CHLOROPIDAE SPP	ADULTS	3			7	2.5(	2.9)
HYMENOPTERA							
HYMENOPTERA SPP	ADULTS	25	5	6	11	11.8(	8.0)
	TOTAL	869	980	752	1301		

Table D-14. Number of animals captured in standardized TN collections (nonquantitative) in the exposed level marsh vegetation of the immature high area, 29 August 1978.

AREA		IM HI TN	IM HI TN	IM HI TN	IM HI TN		
SAMPLER							
SITE		10	10	10	10		
SAMPLE		0001	0002	0003	0004		
TAXON	LIFE STAGE					MEAN(SD)	
INVERTEBRATES							
ARANEAE							
ARANEAE SPP	ADULTS	18	21	13	13	16.3(	3.4)
ACARINA							
ACARINA SPP	ADULTS	18		34	7	12.8(	12.8)
THYSANOPTERA							
THYSANOPTERA SPP	ADULTS	1	7		2	2.5(	2.7)
HEMIPTERA							
HEMIPTERA SPP	UNSPECIFIED	1				.3(	.4)
HEMIPTERA SPP	ADULTS		1			.3(	.4)
MIRIDAE SPP	UNSPECIFIED	1				.3(	.4)
MIRIDAE SPP	ADULTS		1	1	1	.8(	.4)
HOMOPTERA							
DELPHACIDAE SPP	ADULTS	28	8	1	10	11.3(	10.3)
CERCOPIDAE SPP	ADULTS	1	6	3	1	2.8(	2.8)
CICADELLIDAE SPP	ADULTS	9	7	7	2	6.3(	2.6)
APHIDIDAE SPP	ADULTS	1		3	1	1.3(	1.1)
COLEOPTERA							
COLEOPTERA SPP	ADULTS		3	5		2.8(	2.1)
COCCINELLIDAE SPP	ADULTS		1	3		1.0(	1.2)
STAPHYLINIDAE SPP	ADULTS	1				.3(	.4)
PSELAPHIDAE SPP	ADULTS	4	1		1	1.5(	1.5)
CHRYSOMELLIDAE SPP	ADULTS	3	2		1	1.5(	1.1)
LEPIDOPTERA							
LEPIDOPTERA SPP	ADULTS		1	1		.5(	.5)
DIPTERA							
DIPTERA SPP	ADULTS	6			1	1.8(	2.5)
EPHYDRIDAE SPP	ADULTS	1				.3(	.4)
MUSCIDAE SPP	ADULTS	2		1	1	1.0(	.7)
DOLICHOPODIDAE SPP	ADULTS	31	12	15	11	17.3(	8.1)
CERATOPOGONIDAE SPP	ADULTS			2		.5(	.9)
CULICIDAE SPP	ADULTS	1	2			.8(	.8)
SPHAEROCERIDAE SPP	ADULTS		2	2	4	2.0(	1.9)
LONCHOPTERIDAE SPP	ADULTS	4	2			1.5(	1.7)
SCIARIDAE SPP	ADULTS	8	8	12	2	7.5(	3.6)
ANTHOMYIIDAE SPP	ADULTS	2	2	1		1.3(	.9)
XEROMYIIDAE SPP	ADULTS			3		.9(	1.3)
PHORIDAE SPP	ADULTS			2		.5(	.9)
HYMENOPTERA							
HYMENOPTERA SPP	ADULTS	23	6	22	12	17.3(	8.9)
	TOTAL	162	96	131	78		

Table D-15. Number of animals captured in standardized TN collections (nonquantitative) in the exposed level marsh vegetation of the mature high area, 25 September 1978.

AREA		MAT HI TN	MAT HI TN	MAT HI TN	MAT HI TN		
SAMPLER							
SITE		10	10	10	10		
SAMPLE		0001	0002	0003	0004		
TAXON	LIFE STAGE					MEAN	(SD)
INVERTEBRATES							
ARANEAE							
ARANEAE SPP	ADULTS	12	15	10	13	12.5	(1.9)
ACARINA							
ACARINA SPP	ADULTS	21	32	7	2	15.5	(11.8)
COLLEMBOLA							
SMINTHURIDAE SPP	ADULTS		1			.3	(.6)
ORTHOPTERA							
ORTHOPTERA SPP	ADULTS	1	1			.5	(.5)
THYSANOPTERA							
THYSANOPTERA SPP	ADULTS	31	11	4	2	12.0	(11.5)
HEMIPTERA							
PENTATOMIDAE SPP	UNSPECIFIED		1			.3	(.6)
MONOPTERA							
DELPHACIDAE SPP	ADULTS	123	136	48	61	86.5	(29.6)
CICADELLIDAE SPP	ADULTS	38	23	6	12	17.0	(9.3)
APHIDIDAE SPP	ADULTS	5		1	1	1.8	(1.9)
COLEOPTERA							
COLEOPTERA SPP	ADULTS		1	1		.5	(.5)
PSELAPHIDAE SPP	ADULTS			2		.5	(.9)
LIMNEBIIDAE SPP	ADULTS			1		.3	(.6)
CHRYSOMELIDAE SPP	ADULTS	4				1.0	(1.7)
DIPTERA							
DIPTERA SPP	ADULTS	3	3	4	8	4.5	(2.1)
EPHYDRIDAE SPP	ADULTS	1				.3	(.6)
MUSCIDAE SPP	ADULTS		1	2		.8	(.8)
CERATOPOGONIDAE SPP	ADULTS	4	1	3		2.0	(1.6)
CHIRONOMIDAE SPP	ADULTS	2	1			.8	(.8)
PSYCHODIDAE SPP	ADULTS	4	3	5		3.0	(1.9)
CULICIDAE SPP	ADULTS			1		.3	(.6)
SPHAEROCERIDAE SPP	ADULTS	1		1	2	1.0	(.7)
SCIARIDAE SPP	ADULTS	2				.5	(.9)
SCATOPSIDAE SPP	ADULTS	1			1	.3	(.6)
SCIOMYZIDAE SPP	ADULTS					.3	(.6)
HYMENOPTERA							
HYMENOPTERA SPP	ADULTS	64	58	24	8	38.5	(23.3)
	TOTAL	389	258	128	114		

Table D-16. Density (number per square meter) of animals captured by SE along a debris line in the exposed level marsh of the low sand area, 29 August 1978.

AREA		L SAND SE	L SAND SE	L SAND SE	L SAND SE		
SAMPLER							
SITE		12	12	12	12		
SAMPLE		0001	0002	0003	0004		
TAXON	LIFE STAGE					MEAN	(SD)
INVERTEBRATES							
ARANEAE							
ARANEAE SPP	ADULTS	693	577	489	454	554.7	(94.4)
ACARINA							
ACARINA SPP	ADULTS	9993	5590	13033	12019	10158.8	(2855.6)
AMPHIPODA							
AMPHIPODA SPP	ADULTS	804	751	804	1537	974.0	(326.0)
COLLEMBOLA							
SMINTHURIDAE SPP	ADULTS				17	4.4	(7.6)
ISOTOMIDAE SPP	ADULTS	2009	1467	2306	6586	3092.2	(2039.5)
ONYCHIURIDAE SPP	ADULTS	157	35	17	751	240.2	(299.9)
THYSANOPTERA							
THYSANOPTERA SPP	ADULTS	17	35			13.1	(14.5)
HEMIPTERA							
SALDIDAE SPP	NYMPHS		402			100.5	(174.0)
SALDIDAE SPP	ADULTS	559		245	105	227.1	(219.4)
COLEOPTERA							
STAPHYLINIDAE SPP	ADULTS	157				39.3	(68.1)
CARABIDAE SPP	ADULTS	105	52	35	52	61.1	(26.2)
LIMNEBIIDAE SPP	ADULTS	681	384	52	507	406.2	(229.9)
LEPIDOPTERA							
LEPIDOPTERA SPP	ADULTS	17		17		8.7	(8.7)
DIPTERA							
DIPTERA SPP	ADULTS				17	4.4	(7.6)
CHIRONOMIDAE SPP	ADULTS	17				4.4	(7.6)
SPHAEROCERIDAE SPP	ADULTS	105	210	70		96.1	(75.6)
SCIARIDAE SPP	ADULTS	17				4.4	(7.6)
CECIDOMYIIDAE SPP	ADULTS	35				8.7	(15.1)
HYMENOPTERA							
HYMENOPTERA SPP	ADULTS		52	52		26.2	(26.2)
	TOTAL	15372	9555	17120	22045		

Table D-17. Density (number per square meter) of pelagic and epifaunal animals captured by LE in the submerged level marsh of the low sand area, 7 February 1978.

AREA		L SAND	L SAND	L SAND	L SAND		
SAMPLER		LE	LE	LE	LE		
SITE		01	01	01	01		
SAMPLE		8053	8059	8070	8080		
TAXON	LIFE STAGE					MEAN	(SD)
INVERTEBRATES							
CNIDARIA							
CNIDARIA SPP	ADULTS		27		6	8.3(	10.9)
NEMERTEA							
NEMERTEA SPP	ADULTS	3				.6(	1.3)
NEMATODA							
NEMATODA SPP	ADULTS		4			1.0(	1.6)
POLYCHAETA							
AMPHARETIDAE SPP	ADULTS		28			5.1(	8.8)
ETEONE SPP	ADULTS			1	1	.6(	.8)
MAPLOSCOLOPLOS SPP	ADULTS	1	3	5	5	3.5(	1.6)
AMAEANA SPP	ADULTS			3		.6(	1.3)
OLIGOCHAETA							
OLIGOCHAETA SPP	ADULTS	94	78	62	117	85.7(	21.4)
ARANEAE							
ARANEAE SPP	ADULTS	3	6	6	18	7.6(	6.8)
ACARINA							
ACARINA SPP	ADULTS	8	1998	498	974	867.4(	736.6)
COPEPODA							
CALANOIDA SPP	ADULTS		3	5	3	2.5(	1.8)
HARPACTACOIDA SPP	ADULTS	1				.3(	.5)
CUMACEA							
CUMELLA SPP	ADULTS	6	56	84	65	52.7(	28.6)
ISOPODA							
GNORIMOSPHAEROMA LUTEA	ADULTS				1	.3(	.5)
AMPHIPODA							
CORophium SPP	ADULTS	1	5	1	3	2.5(	1.6)
ANISOGAMMARUS CONFERVICOLUS	ADULTS	13	20	10	6	12.7(	6.8)
TALITRIDAE SPP	ADULTS	105	79	50		58.4(	39.1)
ORCHESTIA TKASKIANA	ADULTS	5	1	1	69	19.0(	28.6)
DECAPODA							
DECAPODA SPP	ZOEA	4	1	4		2.2(	1.6)
INSECTA							
INSECTA SPP	PUPAE			1		.3(	.5)
HEMIPTERA							
SALDIDAE SPP	ADULTS		1			.3(	.5)
COLEOPTERA							
COLEOPTERA SPP	LARVAE				1	.3(	.5)
LIMNEBIIDAE SPP	ADULTS		11	10	22	10.8(	7.6)
HETEROCERIDAE SPP	ADULTS		3			.6(	1.1)
DIPTERA							
DIPTERA SPP	LARVAE		1			.3(	.5)
DIPTERA SPP	ADULTS		1			.3(	.5)
EPHYDRIDAE SPP	ADULTS				1	.3(	.5)
MUSCIDAE SPP	LARVAE				1	.3(	.5)
CULICHOPODIDAE SPP	LARVAE		1		1	.6(	.8)
DOLICHOPODIDAE SPP	ADULTS	1	14		15	7.6(	7.2)
CERATOPOGONIDAE SPP	LARVAE				4	1.1(	1.6)
CHIRONOMIDAE SPP	LARVAE	566	309	71	419	341.1(	180.4)
PSICHODIDAE SPP	LARVAE		137		8	36.2(	53.6)
TIPULIDAE SPP	LARVAE				1	.3(	.5)
MYCETOPHILIDAE SPP	LARVAE	22	47	37	24	32.4(	10.2)
					4	1.0(	1.6)
FISH							
COTTIDAE							
LEPTOCOTTUS ARMATUS	ADULTS			1		.3(	.5)
	TOTAL	833	2818	848	1778		

Table D-18. Density (number per square meter) of pelagic and epifaunal fauna captured by LE in the submerged level marsh of the low sand area, 21 July 1978.

AREA		L SAND	L SAND	L SAND	L SAND	
SAMPLER		LE	LE	LE	LE	
SITE		01	01	01	01	
SAMPLE		0001	0032	0086	0094	
TAXON	LIFE STAGE					MEAN(SD)
INVERTEBRATES						
NEMATODA						
NEMATODA SPP	ADULTS	6				1.6(2.7)
OLIGOCHAETA						
OLIGOCHAETA SPP	ADULTS	3		21	3	6.4(8.2)
GASTROPODA						
ALVERIA SPP	ADULTS	11			3	3.5(4.7)
ARANEAE						
ARANEAE SPP	ADULTS	42	30	151	85	77.1(47.2)
ACARINA						
ACARINA SPP	ADULTS	4050	3049	28196	6387	10420.5(10333.6)
COPEPODA						
HARPACTACOIDA SPP	ADULTS	276				68.9(119.3)
MYSIDACEA						
MYSIDACEA SPP	LARVAE				1	.3(.5)
CUMACEA						
HEMILEUCON SPP	ADULTS	1				.3(.5)
CUMELLA SPP	ADULTS	1				.3(.5)
TANAIDACEA						
TANAIDACEA SPP	ADULTS	1				.3(.5)
AMPHIPODA						
CYMOPHIUM SPP	ADULTS			1		.6(1.1)
TALITRIDAE SPP	ADULTS	1		4	15	4.1(6.6)
AMPITHOE SPP	ADULTS	1		4	3	1.3(.9)
ORCHESTIA TRASKIANA	ADULTS		17	29	102	30.9(38.8)
INSECTA						
INSECTA SPP	LARVAE		1			.3(.5)
HEMIPTERA						
PENTATOMIDAE SPP	ADULTS	1				.3(.5)
SALDIDAE SPP	NYMPHS	33	17	51	61	42.0(16.6)
SALDIDAE SPP	ADULTS	5	4	9	9	6.7(2.3)
HOMOPTERA						
HOMOPTERA SPP	ADULTS				1	.3(.5)
DELPHACIDAE SPP	ADULTS	4	1	12	17	8.3(6.1)
APHIDIDAE SPP	ADULTS	4			3	1.6(1.6)
COLEOPTERA						
COLEOPTERA SPP	LARVAE	3	1	4	10	4.6(3.6)
STAPHYLINIDAE SPP	ADULTS		1	1		.9(.6)
CARABIDAE SPP	ADULTS		4	3	7	2.2(1.6)
LIMNEBIIDAE SPP	ADULTS	9	30	95	76	52.5(34.4)
DIPTERA						
DIPTERA SPP	PUPAE	4				1.6(1.6)
DIPTERA SPP	ADULTS	1			3	1.6(1.1)
MUSCIDAE SPP	LARVAE			8		1.9(3.3)
CERATOPOGONIDAE SPP	LARVAE	3		4		1.6(1.7)
CERATOPOGONIDAE SPP	ADULTS	2		3		2.9(1.6)
CHARONOMIDAE SPP	LARVAE	55		1		16.0(23.5)
PSYCHODIDAE SPP	LARVAE			4		1.9(1.7)
SCIARIDAE SPP	ADULTS				1	.3(.5)
SCATOPSIDAE SPP	ADULTS	1				.3(.5)
HYMENOPTERA						
HYMENOPTERA SPP	ADULTS	3	3	5	3	3.2(1.1)
	TOTAL	4534	3156	28599	6787	

Table D-19. Density (number per square meter) of pelagic and epifaunal animals captured by LE in the submerged level marsh of the low sand area, 17 October 1978.

AREA		L SAND	L SAND	L SAND	L SAND	
SAMPLER		LE	LE	LE	LE	
SITE		01	01	01	01	
SAMPLE		0016	0031	0087	0095	
TAXON	LIFE STAGE					MEAN(SD)
INVERTEBRATES						
POLYCHAETA						
SPIRORBIDAE SPP	ADULTS			262		65.4(113.3)
OLIGOCHAETA						
OLIGOCHAETA SPP	ADULTS	13	5	20	8	11.4(5.8)
GASTROPODA						
ALVERIA SPP	ADULTS		3			.6(1.1)
ARANEAE						
ARANEAE SPP	ADULTS	75	22	25	81	50.8(27.4)
ACARINA						
ACARINA SPP	ADULTS	8711	3909	7531	2657	5702.0(2494.3)
CUMACEA						
CUMELLA SPP	ADULTS	3				.6(1.1)
ISOPODA						
GNORIMOSPHAEROMA LUTEA	ADULTS			3		.6(1.1)
AMPHIPODA						
ORCHESTIA TRASKIANA	ADULTS	30	1	132	131	73.7(58.7)
HEMIPTERA						
SALDIDAE SPP	NYMPHS		1			.3(.5)
SALDIDAE SPP	ADULTS		3		3	1.3(1.3)
COLEOPTERA						
STAPHYLINIDAE SPP	ADULTS		3			.6(1.1)
LIMNEBIIDAE SPP	ADULTS	27	13	25	132	49.2(48.2)
DIPTERA						
DIPTERA SPP	PUPAE		3			.6(1.1)
DOLICHOPODIDAE SPP	ADULTS		1			.3(.5)
CERATOPOGONIDAE SPP	LARVAE		8			1.9(3.3)
CHARONOMIDAE SPP	LARVAE				3	.6(1.1)
TABANIDAE SPP	LARVAE		1			.3(.5)
FISH						
GASTEROSTEIDAE						
GASTEROSTEUS ACULEATUS	ADULTS	1				.3(.5)
	TOTAL	8860	3973	7998	3015	

Table D-20. Density (number per square meter) of pelagic and epifaunal animals captured by LE in the submerged level marsh of the low silt area, 6 April 1978.

AREA		L SILT	L SILT	L SILT	L SILT	
SAMPLER		LE	LE	LE	LE	
SITE		01	01	01	01	
SAMPLE		0053	0061	0082	0096	
TAXON	LIFE STAGE					MEAN(SD)
INVERTEBRATES						
CNIDARIA						
CNIDARIA SPP	ADULTS	34	377	136	51	149.5(137.0)
NEMATODA						
NEMATODA SPP	ADULTS	3	83			21.3(35.4)
POLYCHAETA						
CAPITELLIDAE SPP	ADULTS		236	13		62.2(108.6)
ACANTHES LIMNICOLA	ADULTS		1		1	.5(.9)
MOOSONIA FLORIDA	ADULTS	1	215	5	75	74.0(86.3)
OLIGOCHAETA						
OLIGOCHAETA SPP	ADULTS	194	1021	17	272	375.9(383.8)
ACARINA						
ACARINA SPP	ADULTS	11		1		3.2(4.8)
OSTRACODA						
OSTRACODA SPP	ADULTS	4		28	3	6.7(8.8)
COPEPODA						
HARPACTACOIDA SPP	ADULTS	1				.3(.5)
CUMACEA						
MEMILEUCON SPP	ADULTS	36	1899	484	307	661.4(727.8)
ISOPODA						
GNORIMOSPHAEROMA LUTEA	ADULTS	251	47	126	716	285.1(259.4)
AMPHIPODA						
COROPHIUM SPP	ADULTS	33	2244	74	862	803.6(897.2)
AMISLGAMMARUS CONFERVICOLUS	ADULTS	168	38	217	1342	441.3(524.3)
CELLENTULA						
ISOTOMIDAE SPP	ADULTS			1		.3(.5)
ONYCHIURIDAE SPP	ADULTS		1			.3(.5)
DIPTERA						
DIPTERA SPP	PUPAE	108		24	5	34.3(43.5)
MUSCIDAE SPP	LARVAE			9		2.2(3.5)
CHIRONOMIDAE SPP	LARVAE	5	1	5		2.3(2.3)
CERATOPOGONIDAE SPP	LARVAE	56	1063	353	24	376.8(418.9)
CHIRONOMIDAE SPP	LARVAE	1	1	8		2.5(3.7)
TIPULIDAE SPP	LARVAE	1	5			1.6(2.1)
STRATIOMYIDAE SPP	LARVAE			1		.3(.5)
TABANIDAE SPP	LARVAE				1	.3(.5)
FISH						
COTTIDAE						
LEPTOCOTTUS ARMATUS	ADULTS		1	3	1	1.3(.9)
	TOTAL	904	7237	1417	3660	

Table D-21. Density (number per square meter) of pelagic and epifaunal animals captured by LE in the submerged level marsh of the low silt area, 21 July 1978.

AREA		L SILT	L SILT	L SILT	L SILT	
SAMPLER		LE	LE	LE	LE	
SITE		01	01	01	01	
SAMPLE		0027	0073	0077	0095	
TAXON	LIFE STAGE					MEAN(SD)
INVERTEBRATES						
CNIDARIA						
CNIDARIA SPP	ADULTS		1			.3(.5)
POLYCHAETA						
MOOSONIA FLORIDA	ADULTS	5	1	119		31.4(58.8)
OLIGOCHAETA						
OLIGOCHAETA SPP	ADULTS	72	8	107	193	94.9(86.9)
GASTROPODA						
ALVERIA SPP	ADULTS		6			1.6(2.7)
ARANEAE						
ARANEAE SPP	ADULTS	108	9	37	42	48.9(36.3)
ACARINA						
ACARINA SPP	ADULTS	18	3	1	19	8.3(7.1)
OSTRACODA						
OSTRACODA SPP	ADULTS		5			1.3(2.2)
CUMACEA						
MEMILEUCON SPP	ADULTS	18	6			6.0(7.3)
ISOPODA						
GNORIMOSPHAEROMA LUTEA	ADULTS	13820	751	4403	7103	6519.2(4789.2)
AMPHIPODA						
COROPHIUM SPP	ADULTS	306	1	36		85.7(128.8)
INSECTA						
INSECTA SPP	ADULTS				1	.3(.5)
HEMIPTERA						
SALDIDAE SPP	NYMPHS	46	22	72	37	44.1(19.5)
SALDIDAE SPP	ADULTS	13	4	11	3	9.2(6.6)
HOMOPTERA						
DELPHACIIDAE SPP	ADULTS			10		2.5(4.6)
CICADELLIDAE SPP	ADULTS				1	.3(.5)
APHIDIDAE SPP	ADULTS	6	3		1	2.5(2.6)
COLEOPTERA						
COLEOPTERA SPP	ADULTS			1		.3(.5)
STAPHYLINIDAE SPP	ADULTS	15	1		3	4.8(6.1)
DIPTERA						
DIPTERA SPP	PUPAE	52	33	22	32	34.6(11.8)
DIPTERA SPP	LARVAE		1			.3(.5)
DIPTERA SPP	ADULTS		1	1	1	1.0(.9)
MUSCIDAE SPP	LARVAE				9	2.5(3.5)
DOLICHOPODIDAE SPP	LARVAE				1	.3(.5)
CERATOPOGONIDAE SPP	LARVAE	67	6	41	86	50.2(35.3)
CHIRONOMIDAE SPP	LARVAE	2				1.3(.5)
PSYCHODIDAE SPP	LARVAE	44	1	8	479	133.0(208.1)
TIPULIDAE SPP	LARVAE				14	4.4(7.7)
STRATIOMYIDAE SPP	LARVAE		4	6		2.5(2.7)
TABANIDAE SPP	LARVAE			1		.3(.5)
HYMENOPTERA						
HYMENOPTERA SPP	LARVAE	5				1.3(2.2)
FISH						
GASTEROSTEIDAE						
GASTEROSTEUS ACULEATUS	ADULTS				3	.8(1.5)
	TOTAL	14596	867	4876	8032	

Table D-22. Density (number per square meter) of pelagic and epifaunal animals captured by LE in the submerged level marsh of the low silt area, 16 October 1978.

AREA		L SILT	L SILT	L SILT	L SILT	
SAMPLER		LE	LE	LE	LE	
SITE		01	01	01	01	
SAMPLE		0020	0005	0076	0067	
TAXON	LIFE STAGE					MEAN(SD)
INVERTEBRATES						
GNIDARIA GNIDARIA SPP	ADULTS				10	2.5(4.4)
NEMATODA NEMATODA SPP	ADULTS				2351	587.7(1017.9)
POLYCHAETA CAPITELLIDAE SPP	ADULTS				357	89.2(154.5)
NEREIDAE NEREIS FLORIDA	ADULTS				239	59.7(103.4)
OLIGOCHAETA OLIGOCHAETA SPP	ADULTS	52	226	415	5460	1538.4(2267.6)
GASTROPODA ALVANIA SPP	ADULTS				41	10.2(17.6)
ARANEAE ARANEAE SPP	ADULTS		77	6		21.0(32.7)
ACARINA ACARINA SPP	ADULTS		18	13	4	8.6(7.8)
OSTRACODA OSTRACODA SPP	ADULTS				1185	296.2(513.1)
COPEPODA HARPACTACOIDA SPP	ADULTS				20	5.1(8.8)
CUMACEA HEMILEUCON SPP	ADULTS	1	3		24	6.8(10.1)
ISOPODA GNORIMOSPHAEROMA LUTEA	ADULTS	5437	5325	4172	4595	5882.5(1361.1)
AMPHIPODA CORophium SPP	ADULTS	164	9	10	103	92.5(83.2)
ANISOGAMMARUS CONFERVICOLUS	ADULTS	378	197	193	483	313.9(125.1)
ORCHESTIA TRASKIANA	ADULTS		4			1.0(1.6)
DECAPODA HEMIGRAPSUS OREGONENSIS	ADULTS				1	.3(.5)
HEMIPTERA SALDIDAE SPP	NYMPHS	1				.1(.2)
SALDIDAE SPP	ADULTS		1			.3(.5)
DIPTERA DIPTERA SPP	PUPAE				1	.6(1.1)
EPHYDRIDAE SPP	LARVAE				20	1.9(3.3)
DOLICHOPODIDAE SPP	LARVAE		10	4	44	3.8(7.3)
CHIRONOMIDAE SPP	LARVAE		3		4642	1011.2(1753.0)
CERATOPOGONIDAE SPP	LARVAE	1	30	9	15	14.0(10.7)
CHAOBORIDAE SPP	LARVAE		30	4		8.0(12.7)
PSYCHODIDAE SPP	LARVAE		4			1.0(1.6)
TIPULIDAE SPP	LARVAE				3	.6(1.1)
TABANIDAE SPP	LARVAE					
	TOTAL	6038	5937	8826	19049	

Table D-23. Density (number per square meter) of pelagic and epifaunal animals captured by LE in the submerged level marsh of the sedge area, 19 December 1977.

AREA		SEDGE	SEDGE	
SAMPLER		LE	LE	
SITE		01	01	
SAMPLE		0004	0019	
TAXON	LIFE STAGE			MEAN(SD)
INVERTEBRATES				
OLIGOCHAETA OLIGOCHAETA SPP	ADULTS	152	66	109.2(43.2)
ARANEAE ARANEAE SPP	ADULTS	18		8.9(8.9)
ACARINA ACARINA SPP	ADULTS	29		14.6(14.6)
CUMACEA HEMILEUCON SPP	ADULTS	8	4	5.7(1.9)
ISOPODA GNORIMOSPHAEROMA LUTEA	ADULTS	86	15	50.8(35.6)
AMPHIPODA ANISOGAMMARUS CONFERVICOLUS	ADULTS	42	19	30.5(11.4)
TRICHOPTERA LIMNEPHILIDAE SPP	LARVAE		3	1.3(1.3)
LEPIDOPTERA PYRALIDAE SPP	LARVAE	1		.6(.6)
DIPTERA CHIRONOMIDAE SPP	LARVAE	1		.6(.6)
PSYCHODIDAE SPP	LARVAE	145	1	73.0(71.8)
TIPULIDAE SPP	LARVAE	4		1.9(1.9)
	TOTAL	486	108	

Table D-24. Density (number per square meter) of pelagic and epifaunal animals captured by LE in the submerged level marsh of the sedge area, 6 February 1978.

AREA		SEDGE	SEDGE	SEDGE	SEDGE	
SAMPLER		LE	LE	LE	LE	
SITE		01	01	01	01	
SAMPLE		0026	0027	0048	0065	
TAXON	LIFE STAGE					MEAN(SD)
INVERTEBRATES						
CNIDARIA						
CNIDARIA SPP	ADULTS		4			1.00 1.63
OLIGOCHAETA						
OLIGOCHAETA SPP	ADULTS	734	3057	398	1082	1515.75 1847.43
ARANEAE						
ARANEAE SPP	ADULTS	6	15	6	5	8.50 4.11
ACARINA						
ACARINA SPP	ADULTS	989	1050	559	2281	1219.80 641.25
MYSIDACEA						
NEOMYSIS MERCEDIS	ADULTS				3	.60 1.11
CUMACEA						
CUMACEA SPP	ADULTS		23			5.75 9.91
MEMILEUCON SPP	ADULTS	185	6	72	593	214.30 227.91
CUMELLA SPP	ADULTS	14	11	9	18	13.00 3.31
ISOPODA						
GNORIMOSPHAEROMA LUTEA	ADULTS	234	342	161	575	328.80 156.61
AMPHIPODA						
AMPHIPODA SPP	ADULTS		5		1	1.60 2.11
CORophium SPP	ADULTS	28	19	178	187	103.00 77.01
ANISOGAMMARUS CONFERVICOLUS	ADULTS	217	109	346	881	388.00 296.80
ORCHESTIA TRASKIANA	ADULTS			1		.30 .50
HOMOPTERA						
APHIDIDAE SPP	ADULTS			4		1.00 1.63
TRICHOPTERA						
LIMNEPHILIDAE SPP	LARVAE	5	15	6	4	7.60 4.53
LEPIDOPTERA						
PYRALIDAE SPP	LARVAE	1	5	9	14	7.30 4.73
DIPTERA						
EPHYDRIDAE SPP	ADULTS			1		.30 .50
MUSCIDAE SPP	LARVAE	5	17	3	11	8.50 5.54
ODICHOPODIDAE SPP	LARVAE		1	1	1	1.00 .63
CERATOPOGONIDAE SPP	LARVAE	191	307	56	580	283.50 193.11
CHIRONOMIDAE SPP	LARVAE	52	46	48	30	44.20 8.21
PSYCHODIDAE SPP	LARVAE	671	1063	418	2064	1038.50 602.80
TIPULIDAE SPP	LARVAE	4	10			3.50 4.20
FISH						
UNIDENTIFIED						
FISH SPP	LARVAE	1				.30 .50
	TOTAL	3337	6119	2258	9072	

Table D-25. Density (number per square meter) of pelagic and epifaunal animals captured by LE in the submerged level marsh of the sedge area, 6 April 1978.

AREA		SEDGE	SEDGE	SEDGE	SEDGE	SEDGE	
SAMPLER		LE	LE	LE	LE	LE	
SITE		01	01	01	01	01	
SAMPLE		0036	0059	0068	0086	0096	
TAXON	LIFE STAGE						MEAN(SD)
INVERTEBRATES							
CNIDARIA							
CNIDARIA SPP	ADULTS	5	1	18	5	28	9.90 7.61
NEMATODA							
NEMATODA SPP	ADULTS	523	175	211	138	385	286.70 147.31
POLYCHAETA							
NEANTHES LIMNICOLA	ADULTS	1					.30 .91
OLIGOCHAETA							
OLIGOCHAETA SPP	ADULTS	1214	1182	639	853	1078	997.50 211.19
ARANEAE							
ARANEAE SPP	ADULTS	9	17	6	3		6.30 5.71
ACARINA							
ACARINA SPP	ADULTS	2318	2687	1969	1234	1354	1912.40 554.91
OSTRACODA							
OSTRACODA SPP	ADULTS		37		1		7.60 14.60
COPEPODA							
HARPACTACOIDA SPP	ADULTS	23	238	17	30	368	133.60 142.11
CUMACEA							
MEMILEUCON SPP	ADULTS	130	65	213	683	735	369.20 266.21
CUMELLA SPP	ADULTS		1			1	.50 .80
ISOPODA							
ISOPODA SPP	ADULTS				46		9.10 18.31
GNORIMOSPHAEROMA LUTEA	ADULTS	25	27	72		98	44.30 35.40
AMPHIPODA							
CORophium SPP	ADULTS	3	4	6	1	4	3.40 1.71
ANISOGAMMARUS CONFERVICOLUS	ADULTS				1	8	1.80 3.60
DECAPODA							
DECAPODA SPP	MEGALOPS	1					.30 .50
INSECTA							
INSECTA SPP	UNSPECIFIED		1				.20 .40
INSECTA SPP	LARVAE					1	.20 .40
THYSANOPTERA							
THYSANOPTERA SPP	ADULTS					3	.50 1.01
HOMOPTERA							
HOMOPTERA SPP	ADULTS	3	1		1		1.00 1.41
COLEOPTERA							
COLEOPTERA SPP	ADULTS		1				.30 .50
TRICHOPTERA							
LIMNEPHILIDAE SPP	LARVAE			1		3	.80 1.01
LEPIDOPTERA							
PYRALIDAE SPP	LARVAE	4	9	3	1		3.30 3.13
DIPTERA							
DIPTERA SPP	PUPAE	918	857	838	664	587	757.00 150.31
DIPTERA SPP	LARVAE		1		3	1	1.00 1.01
DIPTERA SPP	ADULTS				3		1.00 1.71
MUSCIDAE SPP	LARVAE	4	3				1.40 1.91
ODICHOPODIDAE SPP	LARVAE		1	1	5	4	2.00 2.51
ODICHOPODIDAE SPP	ADULTS	1					.20 .40
CERATOPOGONIDAE SPP	LARVAE	363	177	212	131	188	214.10 79.11
CHIRONOMIDAE SPP	LARVAE	36	37	52	39	67	46.30 12.51
CHIRONOMIDAE SPP	ADULTS	11	4	2			3.10 4.21
PSYCHODIDAE SPP	LARVAE	13	13	18	23	29	19.40 6.31
PSYCHODIDAE SPP	ADULTS	1				1	.50 .80
CULICIDAE SPP	ADULTS			1			.20 .40
TIPULIDAE SPP	LARVAE	1		1		1	.60 .80
TIPULIDAE SPP	ADULTS					1	.20 .40
TENDIPEDIDAE SPP	LARVAE	1			1		.50 .80
FISH							
UNIDENTIFIED							
FISH SPP	LARVAE		1				.20 .40
	TOTAL	5618	5534	4295	3781	4854	

Table D-26. Density (number per square meter) of pelagic and epifaunal animals captured by LE in the submerged level marsh of the sedge area, 16 October 1978.

AREA		SEDGE	SEDGE	SEDGE	SEDGE	
SAMPLER		LE	LE	LE	LE	
SITE		01	01	01	01	
SAMPLE		0015	0053	0070	0069	
TAXON	LIFE STAGE					MEAN(SD)
INVERTEBRATES						
OLIGOCHAETA						
OLIGOCHAETA SPP	ADULTS	255	577	532	1334	699.5(396.2)
ARANEAE						
ARANEAE SPP	ADULTS	66	83	62	72	70.8(7.7)
ACARINA						
ACARINA SPP	ADULTS	889	2584	949	1190	1403.0(691.3)
ISOPODA						
ISOPODA SPP	ADULTS			6		1.6(2.7)
GNORIMOSPHAEROMA LUTEA	ADULTS	38	58	99	30	56.5(26.6)
AMPHIPODA						
COROPHIUM SPP	ADULTS		3		1	1.0(1.1)
TALITRIDAE SPP	ADULTS	3		6		2.2(2.6)
ORCHESTIA TRASKIANA	ADULTS	5	5	9		4.8(3.2)
HEMIPTERA						
SALDIDAE SPP	ADULTS		4			1.0(1.6)
HOMOPTERA						
HOMOPTERA SPP	ADULTS				1	.3(.5)
DELPHACIDAE SPP	ADULTS	8			10	4.4(4.5)
COLEOPTERA						
COCCINELLIDAE SPP	ADULTS			5		1.3(2.2)
CARABIDAE SPP	ADULTS			1		.3(.5)
LEPIDOPTERA						
PYRALIDAE SPP	LARVAE		3			.6(1.1)
DIPTERA						
DIPTERA SPP	PUPAE	1			23	5.4(8.6)
DIPTERA SPP	LARVAE	3			6	2.2(2.6)
DIPTERA SPP	ADULTS		3	1	14	4.4(5.6)
EPHYDRIDAE SPP	LARVAE				1	.3(.5)
MUSCIDAE SPP	LARVAE	6		6	4	4.1(2.6)
DOLICHOPODIDAE SPP	LARVAE	3		3	13	4.4(4.9)
CERATOPOGONIDAE SPP	LARVAE			3	5	1.9(2.1)
CHIRONOMIDAE SPP	LARVAE	1	5	15	23	11.1(8.5)
PSYCHODIDAE SPP	LARVAE	584	1382	677	770	853.1(312.2)
TIPULIDAE SPP	LARVAE	4		5		2.2(2.3)
HYMENOPTERA						
HYMENOPTERA SPP	ADULTS	1			3	1.0(1.1)
	TOTAL	1867	4807	2379	3497	

Table D-27. Density (number per square meter) of pelagic and epifaunal animals captured by LE in the submerged level marsh of the immature high area, 7 February 1978.

AREA		IM HI	IM HI	IM HI	IM HI	
SAMPLER		LE	LE	LE	LE	
SITE		01	01	01	01	
SAMPLE		0008	0025	0026	0092	
TAXON	LIFE STAGE					MEAN(SD)
INVERTEBRATES						
TURBELLARIA						
TURBELLARIA SPP	ADULTS	33		6	1	10.2(13.4)
NEMATODA						
NEMATODA SPP	ADULTS		4	9		3.2(3.8)
OLIGOCHAETA						
OLIGOCHAETA SPP	ADULTS	639	229	130	458	65.1(194.7)
GASTROPODA						
GASTROPODA SPP	ADULTS	11			1	3.2(4.8)
ARTHROPODA						
ARTHROPODA SPP	UNSPECIFIED	1		25		6.7(10.8)
ARANEAE						
ARANEAE SPP	ADULTS	91	32	17	28	41.9(29.1)
ACARINA						
ACARINA SPP	ADULTS	36	8	171	19	59.1(65.8)
COPEPODA						
CALANOIDA SPP	ADULTS			3		.6(1.1)
HARPACTICOIDA SPP	ADULTS			11		2.9(4.9)
CUMACEA						
CUMELLA SPP	ADULTS	19	11	30	22	20.6(6.8)
ISOPODA						
ONISCIDAE SPP	ADULTS				1	.3(.5)
PORCELLIO SCABER	ADULTS	30	1			7.9(13.0)
LIGIDIUM GRACILIS	ADULTS	18	3	6		6.7(6.8)
AMPHIPODA						
GAMMARIDEA SPP	ADULTS	5				1.3(2.2)
ANISOGAMMARUS CONFERVICOLUS	ADULTS	4	6	6	15	7.9(4.3)
TALITRIDAE SPP	ADULTS	1		1	1	1.0(.5)
ORCHESTIA TRASKIANA	ADULTS	1	4	5	9	4.8(2.7)
INSECTA						
INSECTA SPP	UNSPECIFIED			1		.3(.5)
INSECTA SPP	PUPAE				1	.3(.5)
INSECTA SPP	LARVAE	3				.6(1.1)
INSECTA SPP	ADULTS	1				.3(.5)
COLLEMBOLA						
COLLEMBOLA SPP	ADULTS				1	.3(.5)
ISOTOMIDAE SPP	ADULTS	3				.6(1.1)
PODURIDAE SPP	ADULTS	4	3	72		19.7(30.5)
THYSANOPTERA						
THYSANOPTERA SPP	ADULTS	10	3	4	3	4.8(3.2)
HOMOPTERA						
HOMOPTERA SPP	ADULTS	1				.3(.5)
DELPHACIDAE SPP	ADULTS	20		3		5.7(8.5)
CICADELLIDAE SPP	ADULTS	3	5	15	3	6.6(5.2)
COLEOPTERA						
COLEOPTERA SPP	LARVAE	8	5	6	3	5.4(1.9)
COLEOPTERA SPP	ADULTS	4		5		2.2(2.3)
PSELAPHIDAE SPP	ADULTS	6	1	5		2.9(2.6)
CARABIDAE SPP	ADULTS	13	3	4	1	5.1(4.5)
LIMNEBIIDAE SPP	ADULTS			1	9	2.5(3.7)
CHRYSOMELIDAE SPP	ADULTS	1	1	1		1.0(.5)
HYDROPHILIDAE SPP	ADULTS	5		1	17	5.7(6.5)
TRICHOPTERA						
LIMNEPHILIDAE SPP	LARVAE				5	1.3(2.2)
LEPIDOPTERA						
LEPIDOPTERA SPP	LARVAE	1				.3(.5)
DIPTERA						
DIPTERA SPP	PUPAE	3		1		1.0(1.1)
DIPTERA SPP	LARVAE	98	23	6		31.1(39.5)
DIPTERA SPP	ADULTS	1				.3(.5)
MUSCIDAE SPP	LARVAE	5			17	5.4(6.7)
DOLICHOPODIDAE SPP	LARVAE	25	6	17	43	22.3(13.5)
CERATOPOGONIDAE SPP	LARVAE		3			.6(1.1)
CHIRONOMIDAE SPP	LARVAE	42	6	56	169	68.3(60.8)
MYCETOPHILIDAE SPP	LARVAE	48		9	56	28.3(24.2)
HYMENOPTERA						
HYMENOPTERA SPP	ADULTS	1				.3(.5)
FORMICIDAE SPP	ADULTS		1			.3(.5)
CHILOPODA						
CHILOPODA SPP	ADULTS				1	.3(.5)
	TOTAL	1193	354	632	884	

Table D-28. Number of animals taken by AN (nonquantitative) in a large pan of the immature high area, 7 April 1978.

AREA		IM HI
SAMPLER		AN
SITE		01
SAMPLE		0001
TAXON	LIFE STAGE	
INVERTEBRATES		
OLIGOCHAETA		
OLIGOCHAETA SPP	ADULTS	118
COPEPODA		
CALANOIDA SPP	ADULTS	166
HARPACTACOIDA SPP	ADULTS	416
CUMACEA		
CUMELLA SPP	ADULTS	1
AMPHIPODA		
CORophium SPP	ADULTS	1
ANISOGAMMARUS CONFERVICOLUS	ADULTS	350
AMPITHOE SPP	ADULTS	1
ODONATA		
ODONATA SPP	NYMPHS	4
HEMIPTERA		
CORIXIDAE SPP	ADULTS	1
TRICHOPTERA		
LIMNEPHILIDAE SPP	LARVAE	2
DIPTERA		
DIPTERA SPP	ADULTS	1
EPHYDRIDAE SPP	LARVAE	1
MUSCIDAE SPP	LARVAE	3
CHIRONOMIDAE SPP	LARVAE	14
FISH		
GASTEROSTEIDAE		
GASTEROSTEUS ACULEATUS	ADULTS	1
	TOTAL	1080

Table D-29. Number of animals taken by AN (nonquantitative) in three pans of the mature high area. Site 15 was sampled on 1 November 1978, and sites 17 and 18 on 12 April 1979.

AREA		MAT HI	MAT HI	MAT HI		
SAMPLER		AN	AN	AN		
SITE		15	17	18		
SAMPLE		0001	0001	0001		
TAXON	LIFE STAGE				MEAN	(SD)
INVERTEBRATES						
POLYCHAETA						
CAPITELLIDAE SPP	ADULTS			1	.3	(.5)
OLIGOCHAETA						
OLIGOCHAETA SPP	ADULTS	11	1298	71	460.0	(593.1)
COPEPODA						
CALANOIDA SPP	ADULTS			33	11.0	(15.6)
CUMACEA						
HEMILEUCON SPP	ADULTS			14	4.7	(6.6)
ISOPODA						
GNORIMOSPHAEROMA LUTEA	ADULTS	1			.3	(.5)
AMPHIPODA						
CORophium SPP	ADULTS	1		29	10.0	(13.4)
ANISOGAMMARUS CONFERVICOLUS	ADULTS		60	61	40.3	(28.5)
HEMIPTERA						
CORIXIDAE SPP	ADULTS	96		1	32.3	(45.0)
COLEOPTERA						
COLEOPTERA SPP	LARVAE			1	.3	(.5)
LIMNEBIIDAE SPP	ADULTS		48	1	16.3	(22.6)
HYDROPHILIDAE SPP	ADULTS			1	.3	(.5)
TRICHOPTERA						
LIMNEPHILIDAE SPP	LARVAE			4	1.3	(1.9)
DIPTERA						
DIPTERA SPP	PUPAE		6		2.0	(2.8)
EPHYDRIDAE SPP	LARVAE		716	3	239.7	(336.8)
MUSCIDAE SPP	LARVAE			1	.3	(.5)
DOLICHOPODIDAE SPP	LARVAE		2		.7	(.9)
CERATOPOGONIDAE SPP	LARVAE	1	2	1	1.3	(.5)
CHIRONOMIDAE SPP	LARVAE	12	14	3	9.7	(4.9)
CULICIDAE SPP	LARVAE		430		140.0	(205.5)
TABANIDAE SPP	LARVAE		4		1.3	(1.9)
FISH						
UNIDENTIFIED						
FISH SPP	LARVAE			48	16.0	(22.6)
	TOTAL	122	2588	273		

Table D-30. Density (number per square meter) of small infauna in a tidal creek of the sedge area, 24 June 1978. Four SC samples each 10 centimeters deep were collected at sampling point 01, and screened on a 0.5-millimeter sieve.

AREA		SEDGE	SEDGE	SEDGE	SEDGE	
SAMPLER		SC	SC	SC	SC	
SITE		01	01	01	01	
SAMPLE		0101	0102	0103	0104	MEAN(SD)
TAXON	LIFE STAGE					
INVERTEBRATES						
CNIDARIA						
CNIDARIA SPP	ADULTS	987	2467	1480	1480	1603.5(537.6)
NEMATODA						
NEMATODA SPP	ADULTS	2960	30590	9868		10854.4(11943.5)
POLYCHAETA						
CAPITELLIDAE SPP	ADULTS	23189	20229	40457	493	21092.0(14181.5)
NEREIDAE SPP	ADULTS			987		246.7(427.3)
PSEUDOPOLYDORA SPP	ADULTS			493		123.3(213.6)
MOOSONIA FLORIDA	ADULTS	11841	9374	6907	2467	7647.4(3492.5)
OLIGOCHAETA						
OLIGOCHAETA SPP	ADULTS	146507	138640	343392	79928	177616.8(99236.2)
BIVALVIA						
MACOMA BALTHICA	ADULTS	493	493			246.7(246.7)
ACARINA						
ACARINA SPP	ADULTS		493			123.3(213.6)
COPEPODA						
HARPACTACOIDA SPP	ADULTS	987	23189	3947		7030.7(9441.3)
CUMACEA						
HEMILEUCON SPP	ADULTS	10361	7401	4440	5427	6907.3(2261.8)
CUMELLA SPP	ADULTS	493	493	987		493.4(348.9)
AMPHIPODA						
CORCPHIUM SPP	ADULTS	5921	13815	16282	6907	10731.0(4418.1)
ANISOGAMMARUS CONFERVICOLUS	ADULTS	987	987	2960	987	1480.1(854.6)
FISH						
COTTIDAE						
ENOPHRYS BISON	ADULTS				7894	1973.5(3418.2)
	TOTAL	206726	248171	432200	105583	

Table D-31. Density (number per square meter) of small infauna in a tidal creek of the sedge area, 24 June 1978. Four SC samples each 10 centimeters deep were collected at sampling point 02, and screened on a 0.5-millimeter sieve.

AREA		SEDGE	SEDGE	SEDGE	SEDGE	
SAMPLER		SC	SC	SC	SC	
SITE		01	01	01	01	
SAMPLE		0201	0202	0203	0204	MEAN(SD)
TAXON	LIFE STAGE					
INVERTEBRATES						
CNIDARIA						
CNIDARIA SPP	ADULTS	1974				493.4(854.6)
NEMATODA						
NEMATODA SPP	ADULTS	4440		2467	6414	3330.3(2375.8)
POLYCHAETA						
CAPITELLIDAE SPP	ADULTS	13321		6907	11348	7894.1(5115.5)
MOOSONIA FLORIDA	ADULTS	7894	1974	8387	2467	5180.5(2970.5)
OLIGOCHAETA						
OLIGOCHAETA SPP	ADULTS	189458	4440	72527	146534	103239.8(70732.8)
COPEPODA						
HARPACTACOIDA SPP	ADULTS	4934		1480	3454	2466.9(1878.7)
CUMACEA						
HEMILEUCON SPP	ADULTS	13815	3947	10361	9868	9497.6(3547.1)
CUMELLA SPP	ADULTS	493			493	246.7(246.7)
AMPHIPODA						
CORCPHIUM SPP	ADULTS	22202	9374	7894	9374	12211.2(5799.8)
ANISOGAMMARUS CONFERVICOLUS	ADULTS	3947	987	3454	493	2220.2(1500.6)
DIPTERA						
CHIRONOMIDAE SPP	LARVAE	493				123.3(213.6)
	TOTAL	262571	20722	113477	190445	

Table D-32. Density (number per square meter) of small infauna in a tidal creek of the sedge area, 24 June 1978. Four SC samples each 10 centimeters deep were collected at sampling point 03, and screened on a 0.5-millimeter sieve.

AREA		SEDGE	SEDGE	SEDGE	SEDGE	
SAMPLER		SC	SC	SC	SC	
SITE		01	01	01	01	
SAMPLE		0301	0302	0303	0304	
TAXON	LIFE STAGE					MEAN(SD)
INVERTEBRATES						
CNIDARIA						
CNIDARIA SPP	ADULTS		987	493	987	616.7(409.1)
NEMATODA						
NEMATODA SPP	ADULTS	10654	17762	3454	3947	9004.2(5841.7)
POLYCHAETA						
CAPITELLIDAE SPP	ADULTS	23189	2960	3454	987	7647.4(9020.2)
ETEONE SPP	ADULTS	987				246.7(427.3)
PSEUDOPOLYDORA SPP	ADULTS	493				123.3(213.6)
MOOSONIA FLORIDA	ADULTS	5427	5427	4440		3823.7(2244.1)
OLIGOCHAETA						
OLIGOCHAETA SPP	ADULTS	137653	111010	129266	60192	109530.4(30069.9)
BIVALVIA						
MACOMA BALTHICA	ADULTS	493				123.3(213.6)
OSTRACODA						
OSTRACODA SPP	ADULTS		493	493		246.7(246.7)
COPEPODA						
CYCLOPOIDA SPP	ADULTS		493			123.3(213.6)
HARPACTACOIDA SPP	ADULTS	8387	16775	17762	1480	11101.0(6642.3)
CUMACEA						
HEMILEUCON SPP	ADULTS	10854	13815	12334	2467	9867.6(4399.1)
AMPHIPODA						
CORophium SPP	ADULTS	27136	21709	23189	11348	20845.3(5331.2)
ANISOGAMMARUS CONFERVICOLUS	ADULTS		987	4440		1356.8(1825.3)
DIPTERA						
CERATOPOGONIDAE SPP	LARVAE		987			246.7(427.3)
	TOTAL	225473	193405	199325	81408	

Table D-33. Density (number per square meter) of small infauna in a tidal creek of the sedge area, 24 June 1978. Four SC samples each 10 centimeters deep were collected at sampling point 05, and screened on a 0.5-millimeter sieve.

AREA		SEDGE	SEDGE	SEDGE	SEDGE	
SAMPLER		SC	SC	SC	SC	
SITE		01	01	01	01	
SAMPLE		0501	0502	0503	0504	
TAXON	LIFE STAGE					MEAN(SD)
INVERTEBRATES						
CNIDARIA						
CNIDARIA SPP	ADULTS		4934	4440	6414	3947.0(2391.7)
NEMATODA						
NEMATODA SPP	ADULTS	1974	9868	9374	3947	6290.6(3407.1)
POLYCHAETA						
CAPITELLIDAE SPP	ADULTS		6387	2467		2713.6(3427.1)
NEANTHES LIMNICOLA	ADULTS		493			123.3(213.6)
MOOSONIA FLORIDA	ADULTS	1974	5921	3947	6414	4563.8(1757.4)
OLIGOCHAETA						
OLIGOCHAETA SPP	ADULTS	201792	286160	116931	133706	184647.5(66669.7)
GASTROPODA						
GASTROPODA SPP	ADULTS		987		1974	740.1(818.2)
OSTRACODA						
OSTRACODA SPP	ADULTS		1974	493	493	740.1(740.1)
COPEPODA						
HARPACTACOIDA SPP	ADULTS	987	1480	4934	1480	2220.2(1579.6)
CUMACEA						
HEMILEUCON SPP	ADULTS	987		493		370.0(409.1)
ISOPODA						
GNORIMOSPHAEROMA LUTEA	ADULTS		493			123.3(213.6)
AMPHIPODA						
CORophium SPP	ADULTS	6414	27136	22202	22695	19611.9(7858.3)
ANISOGAMMARUS CONFERVICOLUS	ADULTS	493	2960	1974	493	1480.1(1046.6)
INSECTA						
INSECTA SPP	PUPAE				493	123.3(213.6)
DIPTERA						
CERATOPOGONIDAE SPP	LARVAE	493	493		1974	740.1(740.1)
	TOTAL	215114	351286	167255	180083	

Table D-34. Density (number per square meter) of small infauna in a tidal creek of the sedge area, 24 June 1978. Four SC samples each 10 centimeters deep were collected at sampling point 06, and screened on a 0.5-millimeter sieve.

AREA		SEDGE	SEDGE	SEDGE	SEDGE	
SAMPLER		SC	SC	SC	SC	
SITE		01	01	01	01	
SAMPLE		0601	0602	0603	0604	
TAXON	LIFE STAGE					MEAN(SD)
INVERTEBRATES						
CNIDARIA						
CNIDARIA SPP	ADULTS	1974		2467	2960	1850.2(1123.7)
NEMATODA						
NEMATODA SPP	ADULTS	4934	12828	9374	3947	7770.7(3564.2)
POLYCHAETA						
CAPITELLIDAE SPP	ADULTS	26149	15788	22202	18255	20598.6(3337.4)
NEANTHES LIMNICOLA	ADULTS	493			493	246.7(246.7)
MOSSONIA FLORIDA	ADULTS	10154	11348	9868	16775	12211.2(2688.2)
OLIGOCHAETA						
OLIGOCHAETA SPP	ADULTS	236329	239289	178604	158375	203149.2(35405.6)
BIVALVIA						
MACOMA BALTHICA	ADULTS		493			123.3(213.6)
OSTRACODA						
OSTRACODA SPP	ADULTS			493	493	246.7(246.7)
COPEPODA						
HARPACTACOIDA SPP	ADULTS	6414	15788	16775	987	9990.9(6586.0)
CUMACEA						
HEMILEUCON SPP	ADULTS	3947	7401	4440	5427	5303.8(1322.7)
CUMELLA SPP	ADULTS				987	246.7(427.3)
ISOPODA						
GNORIMOSPHAEROMA LUTEA	ADULTS			493		123.3(213.6)
AMPHIPODA						
CORophium SPP	ADULTS	17268	14801	19735	20229	18008.4(2164.7)
ANISOGAMMARUS CONFERVICOLUS	ADULTS	1480	1974	6414		2466.9(2391.7)
	TOTAL	309842	319710	270865	228528	

Table D-35. Density (number per square meter) of small infauna in a tidal creek of the sedge area, 24 June 1978. Four SC samples each 10 centimeters deep were collected at sampling point 08, and screened on a 0.5-millimeter sieve.

AREA		SEDGE	SEDGE	SEDGE	SEDGE	
SAMPLER		SC	SC	SC	SC	
SITE		01	01	01	01	
SAMPLE		0801	0802	0803	0804	
TAXON	LIFE STAGE					MEAN(SD)
INVERTEBRATES						
UNSPECIFIED						
UNSPECIFIED SPP	UNSPECIFIED				493	123.3(213.6)
CNIDARIA						
CNIDARIA SPP	ADULTS			987	1480	616.7(640.9)
NEMATODA						
NEMATODA SPP	ADULTS	987	8881	9374	7894	6784.0(3389.2)
POLYCHAETA						
CAPITELLIDAE SPP	ADULTS	3454	18255	8387	6414	9127.5(5554.6)
MOSSONIA FLORIDA	ADULTS	5427	4440	7894	4934	5673.9(1328.5)
OLIGOCHAETA						
OLIGOCHAETA SPP	ADULTS	48845	65620	140120	126799	95345.7(38858.8)
BIVALVIA						
MACOMA BALTHICA	ADULTS		493	493	493	370.0(213.6)
ACARINA						
ACARINA SPP	ADULTS		493			123.3(213.6)
COPEPODA						
HARPACTACOIDA SPP	ADULTS		1480	5427	2467	2343.6(1985.0)
CUMACEA						
HEMILEUCON SPP	ADULTS	8881	1480	3454	3454	4317.1(2755.3)
CUMELLA SPP	ADULTS	493		493		246.7(246.7)
ISOPODA						
GNORIMOSPHAEROMA LUTEA	ADULTS			1480	987	616.7(640.9)
AMPHIPODA						
CORophium SPP	ADULTS	2467	2960	9868	6414	5427.2(2980.8)
ANISOGAMMARUS CONFERVICOLUS	ADULTS			1974	493	616.7(808.8)
HOMOPTERA						
APHIDIDAE SPP	ADULTS				493	123.3(213.6)
DIPTERA						
CERATOPOGONIDAE SPP	LARVAE				493	123.3(213.6)
	TOTAL	70554	104102	189951	163308	

Table D-36. Density (number per square meter) of large infauna in a tidal creek of the sedge area, 24 June 1978. A 30-centimeter-deep sample was taken by LC at each of six sampling points. The samples were screened on a 2-millimeter sieve.

AREA		SEDGE	SEDGE	SEDGE	SEDGE	SEDGE	SEDGE	
SAMPLER		LC	LC	LC	LC	LC	LC	
SITE		16	16	16	16	16	16	
SAMPLE		0101	0201	0301	0501	0601	0801	
TAXON	LIFE STAGE							MEAN(SD)
INVERTEBRATES								
BIVALVIA								
MACOMA BALTHICA	ADULTS	55	713	219		55	329	228.4(244.0)
	TOTAL	55	713	219		55	329	

Table D-37. Density (number per square meter) of small infauna in a tidal creek of the mature high area, 1 November 1978. Four samples each 10 centimeters deep were collected at sampling point 01, and screened on a 0.5-millimeter sieve.

AREA		MAT HI	MAT HI	MAT HI	MAT HI	
SAMPLER		SC	SC	SC	SC	
SITE		14	14	14	14	
SAMPLE		0101	0102	0103	0104	
TAXON	LIFE STAGE					MEAN(SD)
INVERTEBRATES						
CNIDARIA						
CNIDARIA SPP	ADULTS			1974	493	616.7(808.8)
NEMERTEA						
NEMERTEA SPP	ADULTS		987			246.7(427.3)
NEMATODA						
NEMATODA SPP	ADULTS			987	1480	616.7(640.9)
POLYCHAETA						
CAPITELLIDAE SPP	ADULTS	493	5921	21709	10654	9744.3(7819.5)
AMPHARETIDAE SPP	ADULTS			1974		493.4(854.6)
POLYDORA SPP	ADULTS			1480	493	493.4(604.3)
PYGOSPIO SPP	ADULTS				493	123.3(213.6)
OLIGOCHAETA						
OLIGOCHAETA SPP	ADULTS	11348	12828	13321	28123	16404.9(6904.1)
TANAIDACEA						
TANAIDACEA SPP	ADULTS				493	123.3(213.6)
PANCOLUS SPP	ADULTS			493		123.3(213.6)
AMPHIPODA						
CORophium SPP	ADULTS			6414	987	1850.2(2665.5)
ANISOGAMMARUS CONFERVICOLUS	ADULTS			987		246.7(427.3)
TALITRIDAE SPP	ADULTS			2960		740.1(1281.8)
DIPTERA						
CERATOPOGONIDAE SPP	LARVAE			21215	493	5427.2(9117.5)
CHIRONOMIDAE SPP	LARVAE			493		123.3(213.6)
	TOTAL	11841	19736	74007	43909	

Table D-38. Density (number per square meter) of small infauna in a tidal creek of the mature high area, 1 November 1978. Four SC samples each 10 centimeters deep were collected at sampling point 02 and screened on a 0.5-millimeter sieve.

AREA		MAT HI	MAT HI	MAT HI	MAT HI	
SAMPLER		SC	SC	SC	SC	
SITE		14	14	14	14	
SAMPLE		0201	0202	0203	0204	
TAXON	LIFE STAGE					MEAN(SD)
INVERTEBRATES						
CNIDARIA						
CNIDARIA SPP	ADULTS	1974	6907		3454	3083.6(2524.8)
NEMATODA						
NEMATODA SPP	ADULTS		1480			370.0(640.9)
POLYCHAETA						
CAPITELLIDAE SPP	ADULTS	987	987	6414	987	2343.6(2350.0)
AMPHARETIDAE SPP	ADULTS	1974	1480	493		986.8(780.1)
POLYDORA SPP	ADULTS	987	493	493		493.4(348.9)
PSEUDOPOLYDORA SPP	ADULTS	987				246.7(427.3)
STREBLOSPIO SPP	ADULTS		493			123.3(213.6)
	ADULTS	3454	2960	493		1726.8(1500.6)
OLIGOCHAETA						
OLIGOCHAETA SPP	ADULTS	14308	39470	28616	1480	20968.7(14361.1)
TANAIDACEA						
TANAIDACEA SPP	ADULTS			493		123.3(213.6)
AMPHIPODA						
CORophium SPP	ADULTS	493	493	987	987	740.1(246.7)
AMPITHOE SPP	ADULTS				493	123.3(213.6)
	TOTAL	25164	54763	37989	7401	

Table D-39. Density (number per square meter) of small infauna in a tidal creek of the mature high area, 1 November 1978. Four SC samples each 10 centimeters deep were collected at sampling point 03 and screened on a 0.5-millimeter sieve.

AREA		MAT HI	MAT HI	MAT HI	MAT HI	
SAMPLER		SC	SC	SC	SC	
SITE		14	14	14	14	
SAMPLE		0301	0302	0303	0304	
TAXON	LIFE STAGE					MEAN(SD)
INVERTEBRATES						
CNIDARIA						
CNIDARIA SPP	ADULTS			3454	5427	2220.2(2327.3)
NEMATODA						
NEMATODA SPP	ADULTS				1480	370.0(640.9)
POLYCHAETA						
CAPITELLIDAE SPP	ADULTS		987	2467	23682	6784.0(9795.6)
AMPHARETIDAE SPP	ADULTS		987	5427	19242	6413.9(7683.1)
SPIONIDAE SPP	ADULTS				7694	1973.5(3414.2)
PSEUDOPOLYDORA SPP	ADULTS			987		246.7(427.3)
STREBLOSPIO SPP	ADULTS			493		123.3(213.6)
OLIGOCHAETA						
OLIGOCHAETA SPP	ADULTS	6414	93249	28123	25162	38236.9(32833.9)
CUMACEA						
HEMILEUCON SPP	ADULTS		493	987		370.0(409.1)
TANAIDACEA						
PANCOLUS SPP	ADULTS		493	987	6414	1973.5(2587.3)
AMPHIPODA						
CORophium SPP	ADULTS		1480	36510	44404	20598.6(20060.5)
GAMMARIDEA SPP	ADULTS			493	987	370.0(409.1)
ANISOGAMMARUS CONFERVICOLUS	ADULTS			987		246.7(427.3)
TALITRIDAE SPP	ADULTS			2467		616.7(1065.2)
AMPITHOE SPP	ADULTS				493	123.3(213.6)
DIPTERA						
DIPTERA SPP	ADULTS		493			123.3(213.6)
DOLICHOPODIDAE SPP	LARVAE	493				123.3(213.6)
CERATOPOGONIDAE SPP	LARVAE	493	493		493	370.0(213.6)
CHIRONOMIDAE SPP	LARVAE		493		7401	1973.5(3139.9)
	TOTAL	7400	99168	83382	143079	

Table D-40. Density (number per square meter) of small infauna in a tidal creek of the mature high area, 1 November 1978. Four SC samples each 10 centimeters deep were collected at the sampling point 04 and screened on a 0.5-millimeter sieve.

AREA		MAT HI	MAT HI	MAT HI	MAT HI	
SAMPLER		SC	SC	SC	SC	
SITE		14	14	14	14	
SAMPLE		0401	0402	0403	0404	
TAXON	LIFE STAGE					MEAN(SD)
INVERTEBRATES						
OLIGOCHAETA						
OLIGOCHAETA SPP	ADULTS		987		2960	986.8(1208.5)
TANAIDACEA						
PANCOLUS SPP	ADULTS				987	246.7(427.3)
	TOTAL		987		3947	

Table D-41. Results of sampling for large infauna in a tidal creek of the mature high area, 1 November 1978. No large infauna were found in any of five 30-centimeter-deep samples taken by LC. Samples were screened on a 2-millimeter sieve.

AREA		MAT HI	MAT HI	MAT HI	MAT HI	MAT HI
SAMPLER		LC	LC	LC	LC	LC
SITE		14	14	14	14	14
SAMPLE		0101	0201	0301	0401	0501
TAXON	LIFE STAGE					
INVERTEBRATES		(none captured)				

Table D-42. Number of animals taken by AN (nonquantitative) in two small creeks of the sedge area, 6 April 1978.

AREA SAMPLER SITE SAMPLE		SEDGE AN 01 0001	SEDGE AN 02 0001		
TAXON	LIFE STAGE			MEAN(SD)	
INVERTEBRATES					
CNIDARIA					
CNIDARIA SPP	ADULTS	100	27	63.5(	36.5)
NEMERTEA					
NEMERTEA SPP	ADULTS	1		.5(	.5)
NEMATODA					
NEMATODA SPP	ADULTS	5	6	5.5(	.5)
POLYCHAETA					
CAPITELLIDAE SPP	ADULTS	1	104	52.5(	51.5)
PSEUDOPOLYDORA SPP	ADULTS		7	3.5(	3.5)
PYGOSPIO SPP	ADULTS		43	21.5(	21.5)
MOOSONIA FLORIDA	ADULTS	25	63	44.0(	19.0)
OLIGOCHAETA					
OLIGOCHAETA SPP	ADULTS	291	71	181.0(	110.0)
BIVALVIA					
BIVALVIA SPP	LARVAE	1		.5(	.5)
BIVALVIA SPP	JUVENILES		2	1.0(	1.0)
ARANEAE					
ARANEAE SPP	ADULTS	4	1	2.5(	1.5)
ACARINA					
ACARINA SPP	ADULTS	26	3	14.5(	11.5)
OSTRACODA					
OSTRACODA SPP	ADULTS	3	1	2.0(	1.0)
COPEPODA					
HARPACTACOIDA SPP	ADULTS	13	2	7.5(	5.5)
CUMACEA					
HEMILEUCON SPP	ADULTS	72	216	144.0(	72.0)
ISOPODA					
GNORIMOSPHAEROMA LUTEA	ADULTS	101	13	57.0(	44.0)
AMPHIPODA					
CORophium SPP	ADULTS	56	455	257.5(	201.5)
ANISOGAMMARUS CONFERVICOLUS	ADULTS	80	55	67.5(	12.5)
HEMIPTERA					
SALDIDAE SPP	NYMPHS	1		.5(	.5)
DIPTERA					
DIPTERA SPP	PUPAE	12		6.0(	6.0)
DIPTERA SPP	ADULTS		2	1.0(	1.0)
CERATOPOGONIDAE SPP	LARVAE	76	12	44.0(	32.0)
CHIRONOMIDAE SPP	LARVAE	7		3.5(	3.5)
CHIRONOMIDAE SPP	ADULTS	3		1.5(	1.5)
PSYCHODIDAE SPP	LARVAE	1		.5(	.5)
PSYCHODIDAE SPP	ADULTS	2		1.0(	1.0)
CULICIDAE SPP	ADULTS	8		4.0(	4.0)
TIPULIDAE SPP	LARVAE	1	1	1.0(	0)
FISH					
COTTIDAE					
LEPTOCOTTUS ARMATUS	ADULTS	1		.5(	.5)
	TOTAL	891	1088		

Table D-43. Number of animals taken by AN (nonquantitative) at five sampling points in a tidal creek of the sedge area, 21 July 1978.

AREA		SEDGE	SEDGE	SEDGE	SEDGE	SEDGE		
SAMPLER		AN	AN	AN	AN	AN		
SITE		03	03	03	03	03		
SAMPLE		0101	0201	0301	0601	0801		
TAXON	LIFE STAGE						MEAN	(SD)
INVERTEBRATES								
CNIDARIA								
CNIDARIA SPP	ADULTS	119	6	6		41	34.4	(44.7)
NEMERTEA								
NEMERTEA SPP	ADULTS			1			.2	(.4)
NEMATODA								
NEMATODA SPP	ADULTS	83	15	19	6	18	28.2	(27.8)
POLYCHAETA								
CAPITELLIDAE SPP	ADULTS	1022	5	33	8	247	263.0	(390.1)
NEANTHES LIMNICOLA	ADULTS	5					1.0	(2.0)
PYGOSPIO SPP	ADULTS			2			.4	(.9)
HOBSONIA FLORIDA	ADULTS	185	7	6	30	37	53.0	(67.1)
OLIGOCHAETA								
OLIGOCHAETA SPP	ADULTS	1111	38	84	29	341	320.6	(411.3)
GASTROPODA								
ALDERIA SPP	ADULTS	26	1	10		25	12.4	(11.3)
ARANEAE								
ARANEAE SPP	ADULTS			2	1	3	1.2	(1.2)
ACARINA								
ACARINA SPP	ADULTS	4	6	44	11	18	16.6	(14.5)
OSTRACODA								
OSTRACODA SPP	ADULTS			1		8	1.8	(3.1)
COPEPODA								
CALANOIDA SPP	ADULTS	1					.2	(.4)
HARPACTACOIDA SPP	ADULTS	27	2	7	50	32	23.6	(17.4)
CIRRIPEDIA								
BALANOAE SPP	ADULTS					1	.2	(.4)
CUMACEA								
CUMACEA SPP	ADULTS				2		.4	(.8)
HEMILEUCON SPP	ADULTS	7	2	44	14	54	24.2	(20.8)
CUMELLA SPP	ADULTS	3					.6	(1.2)
ISOPODA								
GNORIMOSPHAEROMA LUTEA	ADULTS	5	7	52	29	295	77.6	(110.0)
AMPHIPODA								
AMPHIPODA SPP	ADULTS			1			.2	(.4)
CORophium SPP	ADULTS	189	10		34	41	38.8	(38.2)
GAMMARIDEA SPP	ADULTS				1		.2	(.4)
ANISOGAMMARUS CONFERVICOLUS	ADULTS	2	1	1	1	8	2.6	(2.7)
TALITRIDAE SPP	ADULTS				1		.2	(.4)
DECAPODA								
HEMIGRAPSUS OREGONENSIS	ADULTS					1	.2	(.4)
INSECTA								
INSECTA SPP	LARVAE					1	.2	(.4)
HEMIPTERA								
HEMIPTERA SPP	NYMPHS		2				.4	(.8)
HEMIPTERA SPP	ADULTS		1				.2	(.4)
SALDIDAE SPP	NYMPHS	1		13			2.8	(5.1)
SALDIDAE SPP	ADULTS					10	2.0	(4.0)
HOMOPTERA								
APHIDIDAE SPP	ADULTS	51	44	17	9	18	27.8	(16.5)
COLEOPTERA								
COLEOPTERA SPP	LARVAE	8		1	2	12	4.6	(4.6)
COLEOPTERA SPP	ADULTS					1	.2	(.4)
STAPHYLINIDAE SPP	ADULTS					3	.6	(1.2)
DIPTERA								
DIPTERA SPP	PUPAE	1			1		.4	(.5)
DIPTERA SPP	ADULTS	2	2	3		23	6.0	(8.6)
EPHYDRIDAE SPP	ADULTS				1		.2	(.4)
MUSCIDAE SPP	LARVAE					6	1.2	(2.4)
DOLICHOPODIDAE SPP	LARVAE	2		2		6	2.0	(2.2)
DOLICHOPODIDAE SPP	ADULTS				1		.2	(.4)
CERATOPOGONIDAE SPP	LARVAE	30	1	4	3	5	8.6	(10.8)
CERATOPOGONIDAE SPP	ADULTS					1	.2	(.4)
CHIRONOMIDAE SPP	LARVAE	1			1		2.0	(3.0)
PSYCHODIDAE SPP	LARVAE	8		14	23		9.0	(8.6)
PSYCHOJIDAE SPP	ADULTS		2				.4	(.8)
TIPULIDAE SPP	ADULTS					3	.6	(1.2)
FISH								
GASTEROSTEIDAE								
GASTEROSTEUS ACULEATUS	ADULTS	1		6	2	4	2.6	(2.2)
	TOTAL	2814	152	373	267	1264		

Table D-44. Number of animals taken by AN (nonquantitative) at three sampling points in a tidal creek of the mature high area, 1 November 1978.

AREA		MAT HI	MAT HI	MAT HI		
SAMPLER		AN	AN	AN		
SITE		16	16	16		
SAMPLE		0101	0201	0401		
TAXON	LIFE STAGE				MEAN(SD)	
INVERTEBRATES						
CNIDARIA						
CNIDARIA SPP	ADULTS		48		16.0(	22.6)
POLYCHAETA						
CAPITELLIDAE SPP	ADULTS	15	24		13.0(	9.9)
AMPHARETIDAE SPP	ADULTS		12		4.0(	5.7)
SPIONIDAE SPP	ADULTS		2	47	16.3(	21.7)
POLYDORA SPP	ADULTS		6		2.0(	2.8)
PSEUDOPOLYDORA SPP	ADULTS		1		.3(	.5)
PRIONOSPIO SPP	ADULTS		1		.3(	.5)
STREBLOSPIO SPP	ADULTS		27		9.0(	12.7)
OLIGOCHAETA						
OLIGOCHAETA SPP	ADULTS	49	40	8	32.3(	17.6)
ACARINA						
ACARINA SPP	ADULTS		1		.3(	.5)
CIRRIPEDIA						
BALANIDAE SPP	ADULTS			1	.3(	.5)
CUMACEA						
HEMILEUCON SPP	ADULTS	1	33		11.3(	15.3)
TANAIDACEA						
PANCELLUS SPP	ADULTS	6	9	4	6.3(	1.7)
LEPTOCHELIA SPP	ADULTS			1	.3(	.5)
ISOPODA						
GNORIMOSPHAEROMA LUTEA	ADULTS		1		.3(	.5)
IDOTEIDAE SPP	ADULTS		1	4	1.7(	1.7)
IDOTEA RESECATA	ADULTS		2	3	1.7(	1.2)
AMPHIPODA						
COROPHIUM SPP	ADULTS	12	31	6	16.3(	10.7)
ANISOGAMMARUS CONFERVICOLUS	ADULTS		2	9	3.7(	3.9)
TALITRIDAE SPP	ADULTS	3	1	2	2.0(	.8)
AMPITHOE SPP	ADULTS	26	11	22	19.7(	6.3)
HEMIPTERA						
SALDIDAE SPP	NYMPHS	1			.3(	.5)
CORIXIDAE SPP	ADULTS			1	.3(	.5)
COLEOPTERA						
COLEOPTERA SPP	ADULTS		1		.3(	.5)
DIPTERA						
DOLICHOPODIDAE SPP	LARVAE		1		.3(	.5)
CHIRONOMIDAE SPP	LARVAE		2		.7(	.9)
TIPULIDAE SPP	LARVAE		2		.7(	.9)
FISH						
COTTIDAE						
LEPTOCOTTUS ARMATUS	ADULTS		1		.3(	.5)
GASTEROSTEIDAE						
GASTEROSTEUS ACULEATUS	ADULTS	2			.7(	.9)
	TOTAL	115	256	108		

Table D-45. Number of animals taken by drift net (nonquantitative) in tidal creeks of the sedge area. Site 03 (at the mouth of the large creek) was sampled by LD for 6 to 8 hours through an ebbtide on 16 October 1978 and on 26 April 1979. Sites 01 and 22 are in small creeks and were sampled by SD for 1 hour on 6 February 1978 (site 01) and for 6 hours on 26 April 1979 (site 22) during ebbtides.

AREA		SEDGE	SEDGE	SEDGE	SEDGE		
SAMPLER		LD	LD	SD	SD		
SITE		03	03	01	22		
SAMPLE		0101	0102	0001	0001		
TAXON	LIFE STAGE					MEAN(SD)	
INVERTEBRATES							
CNIDARIA							
CNIDARIA SPP	ADULTS		21			5.3(	9.1)
NEMATODA							
NEMATODA SPP	ADULTS		12	3		3.8(	4.9)
POLYCHAETA							
CAPITELLIDAE SPP	ADULTS	2	45	3		12.5(	18.8)
NEANTHES LIMNICOLA	ADULTS		1			.3(	.4)
HOBSONIA FLORIDA	ADULTS		5	3		2.0(	2.1)
OLIGOCHAETA							
OLIGOCHAETA SPP	ADULTS	23	98	57		44.5(	36.9)
GASTROPODA							
GASTROPODA SPP	ADULTS	5				1.3(	2.2)
ALDERIA SPP	ADULTS		1			.3(	.4)
ARANEAE							
ARANEAE SPP	ADULTS			1		.3(	.4)
ACARINA							
ACARINA SPP	ADULTS	40	153	1	1	48.8(	62.3)
OSTRACODA							
OSTRACODA SPP	ADULTS	3	1			1.0(	1.2)
COPEPODA							
CALANOIDA SPP	ADULTS	2	14			4.0(	5.8)
HARPACTACOIDA SPP	ADULTS		25	35		15.0(	15.4)
MYSIDACEA							
NEOMYSIS MERCEDIS	ADULTS	1	1			.5(	.5)
CUMACEA							
HEMILEUCON SPP	ADULTS	18	833	1		213.0(	358.0)
CUMELLA SPP	ADULTS	1	30	1		8.0(	12.7)
ISOPODA							
GNORIMOSPHAEROMA LUTEA	ADULTS	1		13		3.5(	5.5)
AMPHIPODA							
COROPHIUM SPP	ADULTS	15	38	270		80.8(	110.1)
GAMMARIDEA SPP	ADULTS	1				.3(	.4)
ANISOGAMMARUS CONFERVICOLUS	ADULTS	19	594	28		160.3(	250.6)
DECAPODA							
DECAPODA SPP	ZOEA	21	5	1		6.8(	8.4)
DECAPODA SPP	MEGALOPS	1				.3(	.4)
HOMOPTERA							
HOMOPTERA SPP	ADULTS		4			1.0(	1.7)
COLEOPTERA							
COLEOPTERA SPP	ADULTS	1				.3(	.4)
TRICHOPTERA							
LIMNEPHILIDAE SPP	LARVAE			2		.5(	.9)
LEPIDOPTERA							
PYRALIDAE SPP	LARVAE			1		.3(	.4)
DIPTERA							
DIPTERA SPP	PUPAE		233			58.3(	100.9)
DIPTERA SPP	ADULTS		4			1.0(	1.7)
DOLICHOPODIDAE SPP	LARVAE	1				.3(	.4)
CERATOPOGONIDAE SPP	LARVAE	8	5	1		3.5(	3.2)
CHIRONOMIDAE SPP	LARVAE		4	6		2.5(	2.6)
PSYCHODIDAE SPP	LARVAE		2			.5(	.9)
TIPULIDAE SPP	LARVAE		1			.3(	.4)
FISH							
UNIDENTIFIED							
FISH SPP	LARVAE	1	21			5.5(	9.0)
COTTIDAE							
LEPTOCOTTUS ARMATUS	ADULTS			3		.8(	1.3)
	TOTAL	164	2151	438	1		

Table D-46. Number of animals taken by drift net (nonquantitative) in tidal creeks of the mature high area. Site 13 (large creek) was sampled by the large drift net on 17 October 1978, 1 November 1978, and 12 April 1979; and site 16 (small creek) was sampled by the small drift net on 12 April 1979. Samples 13-0001 and 13-0002 each sampled about 1 hour and samples 13-0003 and 16-0001 about 2 hours during ebbtide. The latter two samples were collected during high winds which stirred bottom materials and likely affected sample composition.

AREA / SAMPLER / SITE / SAMPLE		MAT HI / LO / 13 / 0001	MAT HI / LO / 13 / 0002	MAT HI / LO / 13 / 0003	MAT HI / SD / 16 / 0001		
TAXON	LIFE STAGE					MEAN	(SD)
INVERTEBRATES							
CNIDARIA							
CNIDARIA SPP	ADULTS		7			1.8(	3.0)
NEMERTEA							
NEMERTEA SPP	ADULTS			40		10.0(	17.3)
NEMATODA							
NEMATODA SPP	ADULTS	4	2	20	1	6.8(	7.7)
POLYCHAETA							
CAPITELLIDAE SPP	ADULTS		11			2.8(	4.8)
SPIONIDAE SPP	ADULTS		1			.3(	.4)
POLYDORA SPP	ADULTS		1			.3(	.4)
STREBLOSPIO SPP	ADULTS		1			.3(	.4)
OLIGOCHAETA							
OLIGOCHAETA SPP	ADULTS	4	41	40	13	24.5(	16.3)
ARANEAE							
ARANEAE SPP	ADULTS		1			.3(	.4)
ACARINA							
ACARINA SPP	ADULTS		3		3	1.5(	1.9)
CUMACEA							
HEMILEUCON SPP	ADULTS		1	12600	326	3231.8(	5410.4)
CUMELLA SPP	ADULTS				8	2.0(	3.5)
TANAIDACEA							
PANCOLUS SPP	ADULTS		2		1	.8(	.8)
ISOPODA							
GNORIMOSPHAEROMA LUTEA	ADULTS			20	2	5.5(	8.4)
AMPHIPODA							
COROPHIUM SPP	ADULTS	1	4			1.3(	1.6)
ANISOGAMMARUS CONFERVICOLUS	ADULTS	1		460	14	119.7(	196.6)
TALITRIDAE SPP	ADULTS		2			.5(	.9)
AMPITHOE SPP	ADULTS	1	1		2	1.0(	.7)
DECAPODA							
DECAPODA SPP	ZOEA				1	.3(	.4)
COLLEMBOLA							
ENTOMOBRYIDAE SPP	ADULTS		1			.3(	.4)
HOMOPTERA							
HOMOPTERA SPP	ADULTS				1	.3(	.4)
DIPTERA							
DIPTERA SPP	PUPAE			20		5.0(	8.7)
DIPTERA SPP	ADULTS				2	.5(	.9)
DOLICHOPODIDAE SPP	LARVAE	1				.3(	.4)
CERATOPOGONIDAE SPP	LARVAE	1				.3(	.4)
FISH							
UNIDENTIFIED							
FISH SPP	LARVAE				1	.3(	.4)
	TOTAL	13	79	13200	379		

Table D-47. Density (number per square meter) of small infauna in a sandflat adjacent to the low sand area, 22 July 1978. A single MC sample 10 centimeters deep was taken at each of 10 sampling points within a 30- by 60-meter grid. The samples were screened on a 0.5-millimeter sieve.

AREA / SAMPLER / SITE / SAMPLE		L SAND / MC / 02 / 0117	L SAND / MC / 02 / 0501	L SAND / MC / 02 / 0611	L SAND / MC / 02 / 1208	L SAND / MC / 02 / 1323	L SAND / MC / 02 / 2111	L SAND / MC / 02 / 2526	L SAND / MC / 02 / 4122	L SAND / MC / 02 / 5412	L SAND / MC / 02 / 5616		
TAXON	LIFE STAGE											MEAN	(SD)
INVERTEBRATES													
NEMERTEA													
NEMERTEA SPP	ADULTS	123					247	247				61.7(	99.4)
NEMATODA													
NEMATODA SPP	ADULTS		617		617	1357	247	863	863	987		555.1(	452.4)
POLYCHAETA													
CAPITELLIDAE SPP	ADULTS	6661	1604	3454	2960	1480	740	1357		493		1874.9(	1931.4)
NEREIDAE SPP	ADULTS								247			24.7(	74.0)
ETEONE SPP	ADULTS	617	247		247	123	617	247	370			246.7(	220.7)
HAPLOSCOLOPLOS SPP	ADULTS	10361	6908	11472	10485	9005	7401	5921	4196	5921	3454	7512.0(	2603.5)
PSEUDOPOLYDORA SPP	ADULTS					123		123		123		37.0(	56.5)
PYGOSPIO SPP	ADULTS	247		247				123	247	247		111.0(	116.4)
ARABELLIDAE SPP	ADULTS		493		1604							209.7(	487.3)
OLIGOCHAETA													
OLIGOCHAETA SPP	ADULTS		2837	5097	2714	2837	2590	3454	2220	4317	2220	2824.7(	1260.0)
BIVALVIA													
CRIPPONYA CALIFORNICA	ADULTS	247				123				247		61.7(	99.4)
OSTRACODA													
OSTRACODA SPP	ADULTS	123										12.3(	37.0)
COPEPODA													
CYCLOPOIDA SPP	ADULTS		493	247	123				123	617		160.4(	214.0)
TANAIDACEA													
PANCOLUS SPP	ADULTS	123										12.3(	37.0)
LEPTOCHELIA SPP	ADULTS							247	617			86.3(	191.5)
AMPHIPODA													
EOHAUSTORIUS SPP	ADULTS	740	247	740	493	493	863	123	617	1604	1480	740.1(	454.9)
PARAPHOXUS SPP	ADULTS	123	123					247	123	247	247	111.0(	102.9)
COLLEMBOLA													
ISOTOMIDAE SPP	ADULTS		123									12.3(	37.0)
HOMOPTERA													
APHIDIDAE SPP	ADULTS		123									12.3(	37.0)
DIPTERA													
CERATOPOGONIDAE SPP	LARVAE	123										12.3(	37.0)
	TOTAL	19488	13815	21217	19243	15541	12705	12952	9621	14803	7401		

Table D-48. Density (number per square meter) of large infauna in a sandflat adjacent to the low sand area, 22 July 1978. A single LC sample 30 centimeters deep was taken at each of 11 sampling points in a 30- by 60-meter grid. The samples were screened on a 2-millimeter sieve.

AREA		L SAND	L SAND	L SAND	L SAND	L SAND	L SAND	L SAND	L SAND
SAMPLER		LC	LC	LC	LC	LC	LC	LC	LC
SITE		16	16	16	16	16	16	16	16
SAMPLE		0117	0501	0811	1208	1323	2111	2526	4122
TAXON	LIFE STAGE								
INVERTEBRATES									
BIVALVIA									
CRYPTOMYA CALIFORNICA	ADULTS	55	55	110	164	55	164	55	55
DECAPODA									
CALLIANASSA SPP	ADULTS		219	219	110	55	164		55
	TOTAL	55	274	329	274	110	328	55	110

SAMPLER		LC	LC		
SITE		16	16		
SAMPLE		5412	5818		
TAXON	LIFE STAGE			MEAN(SD)	
INVERTEBRATES					
BIVALVIA					
CRYPTOMYA CALIFORNICA	ADULTS	55	55	82.2(	44.2)
DECAPODA					
CALLIANASSA SPP	ADULTS	164	164	115.1(	79.3)
	TOTAL	219	219		

Table D-49. Density (number per square meter) of small infauna in a mudflat adjacent to the sedge area, 24 June 1978. A single MC sample 10 centimeters deep was taken at each of 10 sampling points in a 30- by 60-meter grid. The samples were screened on a 0.5-millimeter sieve.

AREA		SEDGE	SEDGE	SEDGE	SEDGE	SEDGE	SEDGE	SEDGE	SEDGE		
SAMPLER		MC	MC	MC	MC	MC	MC	MC	MC		
SITE		02	02	02	02	02	02	02	02		
SAMPLE		0113	0303	0416	1508	2318	2414	5411	5922		
TAXON	LIFE STAGE									MEAN(SD)	
INVERTEBRATES											
CNIDARIA											
UNIDARIA SPP	ADULTS			987			123	247		169.6(	320.1)
NEMATODA											
NEMATODA SPP	ADULTS		5427							678.4(	1794.9)
POLYCHAETA											
CAPITELLIDAE SPP	ADULTS	2220	48212	6366	7401	9375	3947	19489	2220	11656.6(	11980.7)
ETEONE SPP	ADULTS	247	247	247		740	370	740	740	410.3(	269.4)
PSEUDOPOLYDORA SPP	ADULTS	493		740	493	1234		1480	493	616.8(	493.4)
PYGOSPIO SPP	ADULTS		247	4194		6414	493	2220	1974	1942.3(	2169.8)
STREBLOSPIO SPP	ADULTS				247		247			61.7(	106.8)
NOTOMASTUS FLORIDA	ADULTS	1727		1480	1234	2714	1234	4194	2220	1830.3(	1157.1)
OLIGOCHAETA											
OLIGOCHAETA SPP	ADULTS	39965	54027	31084	49833	36265	15789	57481	47120	41465.6(	12809.4)
GASTROPODA											
ALVANIA SPP	ADULTS		2714	247					247	408.9(	880.4)
BIVALVIA											
MACOMA BALTHICA	ADULTS	493			740		247	247	987	339.2(	347.5)
COPEPODA											
HARPACTACOIDA SPP	ADULTS		1480							185.8(	489.5)
CUMACEA											
MEMILEUCON SPP	ADULTS	8388	493	9868	11842	15542		10115	1727	7246.8(	5418.9)
CUMELLA SPP	ADULTS					247				30.8(	81.6)
AMPHIPODA											
CORophium SPP	ADULTS	6661		5674	6414	5674	4194	5181	247	4255.6(	2487.7)
AMPELISCA MACRAUS CONFERVICOLUS	ADULTS			247			123	247		61.7(	106.8)
TALITRIDAE SPP	ADULTS									15.4(	40.8)
DIPTERA											
DOLICHOPODIDAE SPP	LARVAE		247							30.8(	81.6)
	TOTAL	60194	113094	63156	78284	78285	28767	101641	57975		

Table D-50. Density (number per square meter) of large infauna in a mudflat adjacent to the sedge area, 24 June 1978. A single LC sample 30 centimeters deep was taken at each of 10 sampling points in a 30- by 60-meter grid (two samples were lost during processing). The samples were screened on a 2-millimeter sieve.

AREA		SEDGE	SEDGE	SEDGE	SEDGE	SEDGE	SEDGE	SEDGE	SEDGE
SAMPLER		LC	LC	LC	LC	LC	LC	LC	LC
SITE		03	03	03	03	03	03	03	03
SAMPLE		0113	0303	0505	0816	1508	2310	2414	4423
TAXON	LIFE STAGE								
INVERTEBRATES									
BIVALVIA									
MACOMA BALTHICA	ADULTS	439	658		932	439	548	384	1535
DECAPODA									
HEMIGRAPSUS OREGONENSIS	ADULTS		55						
	TOTAL	439	713		932	439	548	384	1535

AREA		SEDGE	SEDGE	SEDGE	
SAMPLER		LC	LC	LC	
SITE		03	03	03	
SAMPLE		4016	5411	5922	
TAXON	LIFE STAGE				MEAN(SD)
INVERTEBRATES					
BIVALVIA					
MACOMA BALTHICA	ADULTS	603	1042	877	677.8(367.8)
DECAPODA					
HEMIGRAPSUS OREGONENSIS	ADULTS				5.0(15.8)
	TOTAL	603	1042	877	

APPENDIX E

FISH SAMPLE DATA

Abbreviations for gear used in this appendix are

LS = large seine
MS = medium seine
OT = otter trawl
SS = small seine

Table E-1.

Area 1 (Low Sand)
Sampler MS
Site 13
Sample 01
Habitat Low level marsh
Date 17 November 1978

Fork Length (mm)	Shiner surfperch	Threespine stickleback
30		2
32		1
33		2
34		1
35		5
36		7
37		3
38		6
39		9
40		5
41		5
42		8
43		9
44		6
45		1
46		1
75	1	

Table E-2.

Area 7 (Netarts Seine)
Sampler MS
Site 01
Samples 0101-1401
(Combined results of 14 samples)
Habitat Low level marsh
Date 12 April 1979

Fork Length (mm)	Staghorn Sculpin	Threespine Stickleback	Surf Smelt	Chum Salmon
27	2			
29	1			
30	3			
32	7			
33	8			
34	5			
35	2			
36	1			1
37	5			1
38	8			6
39	7			6
40	5			7
41	4		1	4
42	2			2
43	3			
44			2	
45	4	3		
46	2			
48		3	1	
49	2	1		
50		2		
51		1		
52		1		
56	1			
57	1			
59	1			
61	1			
66				1
67	1			

Table E-3.

Area 2 (Low Silt)
Sampler MS
Site 01
Sample 01
Habitat Low level marsh
Date 6 April 1978

Fork Length (mm)	Staghorn Sculpin	Threespine Stickleback	Surf Smelt	Chum Salmon
19	1			
23	1			
29	1			
37	1			
39	1			
40				1
47		1	1	
49			4	
50			5	
51			2	
52	1		5	
53		2	11	
54			5	
55	1		4	
56			2	
57		1	4	
58			2	
59	2		3	
60	1			
61	1			
63			2	
64			1	

Table E-4.

Area 3 (Sedge)
Sampler MS
Site 01
Sample 01
Habitat Low level marsh
Date 6 February 1978

Fork Fork Length (mm)	Staghorn Sculpin	Threespine Stickleback
22	1	
32	1	
40		1
43	1	

Table E-5.

Area 8 (Siletz Seine)
Sampler LS
Site 01
Samples 01, 02, 04
(Combined results of 3 samples)
Habitat Low level marsh
Date 26 April 1979

Fork Length (mm)	Staghorn Sculpin	Threespine Stickleback	Surf Smelt	Starry Flounder	Chum Salmon
18	1				
21	1				
23	3				
25	3				
27	1				
29	1				
31	1				
36	1				
37	1				
38	2				
39	4				
40	1		1		
42					2
43	1		1		1
44	1				4
45					5
46			2		1
47			2		2
48	2		3		2
49			4		1
50			6		1
51		1	1		1
52			2		3
53			6		1
54			5		
55			1		2
56			2		1
57			2		
58			3		
59					1
60	1		1		
171				1	
187				1	
191				1	
193				1	
213				1	
246				1	
258				1	
266				1	

Table E-6.

Area 2 (Low Silt)
Sampler MS
Site 10
Sample 01
Habitat Pan
Date 18 September 1978

Fork Length (mm)	Threespine Stickleback
20	1
21	1
22	1
25	3
26	4
27	5
28	3
29	4
30	1
32	2
33	1

Table E-7.

Area 3 (Sedge)
Sampler SS
Site 18
Sample 01
Habitat Pan
Date 18 September 1978

Fork Length (mm)	Threespine Stickleback
12	1
13	2
14	3
15	4
16	2
17	1
18	3
19	1
20	1
21	1
24	1

Table E-8.

Area 4 (Immature High)
Sampler MS
Site 01
Sample 01
Habitat Pan
Date 7 April 1978

Fork Length (mm)	Staghorn Sculpin	Threespine Stickleback
48		1
50		1
52		1
55		1
60		1
62		1
76	1	

Table E-9.

Area 5 (Mature High)
Sampler MS
Site 15
Sample 01
Habitat Pan
Date 1 November 1978

Fork Length (mm)	Threespine Stickleback
31	1
33	2
34	1
35	11
36	4
37	16
38	25
39	18
40	23
41	10
42	8
43	4
44	1
45	2
46	1
48	1

Table E-10.

Area 5 (Mature High)
Sampler MS
Site 15
Sample 02
Habitat Pan
Date 12 April 1979

Fork Length (mm)	Staghorn Sculpin	Threespine Stickleback
44	1	
45	1	
48	1	
50	1	
51	1	1
52	3	1
53	3	5
54	1	1
55	4	3
56	2	
57	3	1
58	1	
59	2	
60	1	
62	1	
63	1	
65	1	

Table E-11.

Area 2 (Low Silt)
Sampler MS
Site 02
Sample 01
Habitat Saall Tidal Creek
Date 6 April 1978

Fork Length (mm)	Staghorn Sculpin	Threespine Stickleback
17	1	
21	1	
22	1	
23	3	
24	2	
26	1	
27	3	
28	3	
29	4	
30	1	1
31	2	
33	2	
34	3	
35	1	
36	1	1
37	3	
38	3	
39	2	1
40	2	1
41	3	
42	2	
43	2	
44	3	1
46	1	
47	2	
48	3	
49	2	
50	1	
51	2	
52	3	
53	2	
54	1	
55	2	
56	1	
57	3	
58	2	
60	1	

Table E-12.

Area 2 (Low Silt)
Sampler MS
Site 02
Sample 02
Habitat Small tidal creek
Date 18 September 1978

Fork Length (mm)	Staghorn Sculpin	Threespine Stickleback
20		1
21		2
22		2
23		5
24		1
25		14
26		14
27		15
28		17
29		12
30		8
31		5
32		6
33		3
34	1	5
35		1
36	1	1
38	1	
39	1	
40		1
41		1
44		1
76		1

Table E-13.

Area 3 (Sedge)
Sampler SS
Sites 01, 02
Samples 01, 01
(Combined results of 2 samples)
Habitat Small tidal creek
Date 6 April 1978

Fork Length (mm)	Staghorn Sculpin
23	1
25	1
38	1
46	1
47	1
48	3
50	1
53	1
63	1

Table E-14.

Area 3 (Sedge)
Samplers MS, SS
Site 17
Samples 0201, 0301, 0601, 0801
(Combined results of 4 samples)
Habitat Large tidal creek
Date 18 September 1978

Fork Length (mm)	Topsmelt	Staghorn Sculpin	Prickly Sculpin	Coastrange Sculpin	Shiner Surfperch	Threespine Stickleback
22						2
23						3
24						4
25						4
26						7
27						20
28						20
29						21
30						24
31						21
32	1					16
33						5
34			1			9
35			2			8
36						6
37				1		5
38						3
40						1
41			1			
44	1					
61						1
72					1	
82		1				
84		1				
89		1				
90		1				
93		1				
115		1				
124		1				

Table E-15.

Area 5 (Mature High)
Sampler MS
Site 14
Sample 0101, 0201, 0401
(Combined results of 3 samples.)
Habitat Large tidal creek
Date 1 November 1978

Fork Length (mm)	Staghorn Sculpin	Threespine Stickleback
22		1
23		1
27		1
28		3
29		5
30		1
31		4
32		4
33		9
34		6
35		15
36		12
37		8
38		20
39		13
40		23
41		15
42	2	23
43		13
44		12
45		6
46		4
47		3
48		2
49		2
51		1
54		1
58		1

Table E-16.

Area 5 (Mature High)
Sampler MS
Site 14
Sample 0102, 0301
(Combined results of 2 samples.)
Habitat Large tidal creek
Date 12 April 1979

Fork Length (mm)	Staghorn Sculpin	Threespine Stickleback	Surf Smelt	Chum Salmon
35	2			
36	2			
37	1			
39	1	1		1
40	5			
41	4			
42	3		1	
43	6			
44	2			
45	4			
46	4			
47	5	1		
48	7	1		
49	3			
50	2			
51	3			
52	7	2		
53	3			
54	2			
55	3			
56	2	2		
57	2			
59	3			
61	4			
63	1			
64	1			
69	1			
73	2			
82	1			

Table E-17.

Area 3 (Sedge)
Sampler LS
Site 11
Sample 01
Habitat Slough
Date 18 September 1978

Fork Length (mm)	Staghorn Sculpin	Sculpin	Prickly Sculpin	Shiner Surfperch	White Surfperch	Northern Anchovie	Threespine Stickleback	Surf Smelt	Starry Flounder	Chinook Salmon
25							2			
26							1			
27							3			
28							2			
29							8			
30							12			
31							15			
32							9			
33							12			
34							12	1		
35							14			
36							10			
37							8			
38							9			
39							1			
40							9			
41							3			
43							1			
44							2			
45							1			
46							1			
47							1			
50							2			
51							1			
52							1			
55							1			
58				1						
60				1						
61				6						
62				6						
63				4						
64				6						
65				7						
66				7						
67				5						
68				4						
69				4						
70				5						
71				4						
72				2						
73				1		1				
74				3		1				
75				1						
76					1	1				
84				2						
94				1						
97									1	1
98				1						
99				1						
101										2
102										1
104										1
105				2						1
108				1						
110						1				
113				3						
114				2						
122				1						
128									1	
130				1						
131				1						
137									1	
138	1									
142			1							
160	1									
172								1		
196									1	

Table E-18.

Area 3 (Sedge)
Sampler LS
Site 10
Sample 01
Habitat Slough
Date 18 September 1978

Fork Length (mm)	Staghorn Sculpin	Sculpin	Shiner Surfperch	Surfperch	Pacific Tomcod	Threespine Stickleback	Starry Flounder	Speckled Sanddab	Saddleback Gunnel	Starry Flounder	Chinook Salmon	Salmon
32						1						
35						1						
50			1									
51			1									
52			1									
53			2									
55			1									
56			4									
57			4									
58			9									
59			1									
60			1									
61			4									
62			7									
63			7									
64			6									
65			13									
66			3									
67			11									
68			14									
69			16									
70			22									
71			12									
72			6									
73			15									
74			11									
75			17									
76			8									
77			7									
78			6									
79			7		1							
80			5						1			
82			1									
83			3									
84			1									
85			2									
86			1									
87			2									
88			2									1
92			3									
93			1									
94			2									
95			2									
96			3									1
97			4									
98			3									
99			2									1
100			7									2
101		1	2									
102			4									
103			4									
105			2									1
106			3									
107			4						1			
108			5									
109			3									
110			9									
111			3									
112			2									
113			6									
114			6									
115		1	5									
116			1									
117			1									
118			2									
119			1									
120			2									
121			1									
122			2									
124			2									
125			2							1		
127			1									
128			2									
129			2									
133			1									
137			1									
147		1										
154			1									
164									1			
173		1										

Table E-19.

Area 3 (Sedge)
Sampler LS
Site 10
Sample 02
Habitat Slough
Date 26 April 1979

Fork Length (mm)	Staghorn Sculpin	Shiner Surfperch	Threespine Stickleback	Surf Smelt	Starry Flounder	Chum Salmon	Chinook Salmon	Steelhead Trout
36	1							
41	1							
43	2							
45	1							
47	1							
48						1		
49				1				
50			1			1		
54								
55				3				
56				2				
58				1				
60			1	1		1		
62				2			1	
63				1				
64				2				
65				2				
66				2				
67				3				
68				3				
69				1				
70				1			1	
71				1				
73				1				
74		1						
83		1						
89		1						
109		1						
112		1						
113		1						
115		1						
116		1						
118		1						
125		3						
128		1						
135		1						
136		1						
138		1						
180								1
228					1			

Table E-20.

Area 3 (Sedge)
Sampler MS
Site 23
Sample 01
Habitat Slough (shallow region)
Date 26 April 1979

Fork Length (mm)	Staghorn Sculpin
28	1
35	1
36	1
39	1
40	2
41	2
42	2
43	3
44	3
45	3
46	3
47	2
48	1
49	1
50	1
51	2
52	2
53	4
54	1
56	1
60	1

Table E-21.

Area 1 (Low Sand)
Sampler MS
Site 01
Sample 01
Habitat Tidal flat (sandy)
Date 7 February 1978

Fork Length (mm)	Staghorn Sculpin	Surf Smelt
36	1	2
41		1
42		1

Table E-22.

Area 1 (Low Sand)
Sampler MS
Site 01
Sample 02
Habitat Tidal flat (sandy)
Date 3 June 1978

Fork Length (mm)	Staghorn Sculpin	English Sole
33		1
35		1
45	1	
46		1
48		1
50		1
51	1	
53	1	
55	1	1
60	1	
62	1	

Table E-23.

Area 2 (Low Silt)
Sampler MS
Site 11
Sample 01
Habitat Tidal flat (muddy)
Date 18 September 1978

Fork Length (mm)	Shiner Surfperch	Threespine Stickleback
11	1	
21	3	
22	1	
23	1	
24	4	
25	6	
26	10	
27	4	
28	8	
29	8	
30	9	
31	4	
32	1	
33	2	
34	3	
35	1	
37	1	
39	1	
41	1	
52	1	
60		1
67		1
68		1
73		1

Table E-24.

Area 9 (Siletz Trawl)
Sampler OT
Site 11
Sample 01
Habitat Tidal flat (muddy)
Date 18 September 1978

Fork Length (mm)	Staghorn Sculpin	Shiner Surfperch	Saddleback Gunnel	Starry Flounder	English Sole	Sand Sole
65		1				
70	1					
75				1		
77			1			
79			1	1		
80				2		
83			2			
84			1	1		
85				1		
87			1			
88			1			
93		1				
95		1		1		
97				1		
99				2		
100						1
102	1			1		
103				1		
106		1				
113	1					
115		2	1			
116	1					
117	2					
119		1				
120	1					
124					1	
128			1			
130				1		
133	1					
135				2		
141				1		
144				2		
150				1		
160				1		
165				1		
167				1		
182				1		
185				1		
193	1					
201				1		
218				1		
243				1		

Area 6 (Netarts Trawl)
Sampler OT
Sites 01-08
Sample 01 (each site)
(Combined results of eight samples.)
Habitat Bay channel
Date 2 June 1978

Fork Length (mm)	Pacific Sandlance	Speckled Sanddab	Sailfin Sculpin	Buffalo Sculpin	Cabezon	Tubesnout	Threespine Stickleback	Lingcod	Kelp Greenling	Surf Smelt	Saddleback Gunnel	English Sole	Sand Sole	Snake Prickleback	Bay Pipefish	Rockfish spp.
20												1				
21												1				
23												4				
24												4				
25												7				
26												7				
27												23				
28		1										25				
29												30				
30												23				
31												16				
32												18				
33												15				
34				1								7				
35												13				
36												6				
37			1									5				
38		1										3				
39				1								9				
40												9				
41		3										1				
42		1										8				1
43		4										6				
44		3										5				
45		3										4				
46		3				1						4				
47		5										10				
48		4										4				
49		3				1						3				
50			1									4				
51												7				
52		1				2						7				
53		1	1									2				
54		1										2				
55			1				2					3				
56		2	1									3				
57												5				
58			2									3				
59		1	1				1		1			1				
60			4						1			3				
61	2	4	1									2				
62	1		1						1			4				
63		1	1						6			2				
64		2	2													
65		3							2			2				
66		1	1									1				
67			1						1							
68		1	1						2							
70		2	3						2							
71		1	1	1							1					
72								1	1							
73			2						3							
74	1								2			1		1		
75			3			1				1		2				

Area 6 (Netarts Trawl)
Sampler OT
Sites 01-08
Sample 01 (each site)
(Combined results of eight samples.)
Habitat Bay channel
Date 2 June 1978

Fork Length (mm)	Pacific Sandlance	Speckled Sanddab	Sailfin Sculpin	Buffalo Sculpin	Cabezon	Tubesnout	Threespine Stickleback	Lingcod	Kelp Greenling	Surf Smelt	Saddleback Gunnel	English Sole	Sand Sole	Snake Prickleback	Bay Pipefish	Rockfish spp.
76		2	3													
77			3													
78		1	1								2					
79		3	2													
80		1	1	1								1				
81	1		2						1		1					
82	1	1	1													
83	1		1													
84		2	3								1	1				
85	1		3				1					2				
86			2									1				
87																
88																
89			1									1				
90			2													
91			1													
92											1					
93																
94																
95												1				
96			1									1				
97			1													
98												1				
99													1			
100			1								2					
101													1			
102																
103			1										1			
105																
106																
108												1				
110																
111																
115		1														
116																
120													1			
127																
129											1					
139								1								
156																
166														1		
214				1											1	
217															1	
232															1	
245															1	
248																

Table E-26.

Area 9 Siletz Trawl
Sampler OT
Sites 12, 15, 16
Sample 01 (each site)
(Combined results of 3 samples.
Habitat Bay channel
Date 18 September 1978

Fork Length (mm)	Staghorn Sculpin	Buffalo Sculpin	Cabezon	Shiner Surfperch	Threespine Stickleback	Saddleback Gunnel	Starry Flounder	English Sole	Sand Sole	Chinook Salmon
32					1					
51								1		
53		1								
62						1				
66			1							
68				1						
70							1			
79							1			
82	1									
90										1
91								1		
95								1		
97									1	
98	1									
99								1		
103								1		
107	1									
111	1									
118						1				
120	1									
123							1			
124	1						1			
126							2			
134							1			
135							1			
138							1			
144							1			
146							1			
159							1			
171	1									
181							1			
193							1			
324							1			
384							1			
425							1			

APPENDIX F

FISH FOOD HABITS DATA

Stomach contents of fish captured in marsh and bay channel habitats. Each food habits table is referenced to the appropriate table in Appendix E which provides species and length-frequency data for the sample. Mean prey volumes are shown for all fish examined in a sample (excluding fish with empty stomachs). Means shown as ".0" represent values <.05 percent.

Fish species codes are interpreted in the following table:

	Family	Scientific Name	Common Name
0301	Ammodytidae	*Ammodytes hexapterus*	Pacific Sandlance
0401	Atherinidae	*Atherinops affinis*	Topsmelt
0901	Bothidae	*Citharichthys stigmaeus*	Speckled Sanddab
1601	Cottidae	*Leptocottus armatus*	Staghorn Sculpin
1602	Cottidae	*Enophrys bison*	Buffalo Sculpin
1603	Cottidae	*Scorpaenichthys marmoratus*	Cabezon
1604	Cottidae	*Cottus asper*	Prickly Sculpin
1605	Cottidae	*Cottus aleuticus*	Coastal Sculpin
2201	Embiotocidae	*Cymatogaster aggregata*	Shiner Surfperch
2202	Embiotocidae	*Phanerodon furcatus*	White Surfperch
2301	Engraulidadae	*Engraulis mordax*	Northern Anchovy
2401	Gadidae	*Microgadus proximus*	Pacific Tomcod
2501	Gasterosteidae	*Aulorhynchus flavidus*	Tubesnout
2502	Gasterosteidae	*Gasterosteus aculeatus*	Threespine Stickleback
2901	Hexagrammidae	*Ophiodon elongatus*	Lingcod
2902	Hexagrammidae	*Hexagrammos decagrammus*	Kelp Greenling
3401	Osmeridae	*Hypomesus pretiosus*	Surf Smelt
3901	Pholidae	*Pholis ornata*	Saddleback Gunnel
4001	Pleuronectidae	*Platichthys stellatus*	Starry Flounder
4002	Pleuronectidae	*Parophrys vetulus*	English Sole
4003	Pleuronectidae	*Psettichthys melanostictus*	Sand Sole
4401	Salmonidae	*Oncorhynchus keta*	Chum Salmon
4402	Salmonidae	*Oncorhynchus tshawytscha*	Chinook Salmon
4403	Salmonidae	*Salmo gairdneri*	Steelhead Trout
4801	Scorpaenidae	*Sebastes spp*	Rockfish spp
5301	Stichaetidae	*Lumpenus sagitta*	Snake Prickleback
5401	Syngnathidae	*Syngnathus leptorhynchus*	Bay Pipefish

Abbreviations for gear used in this appendix are

LS = large seine
MS = medium seine
OT = otter trawl
SS = small trawl

Table F-1. (Reference Table E-1)

AREA: L SAND
SAMPLER: MC
SITE: 13
SAMPLE# 1

SPECIES#		2502		2502		2502		2502		2502		2502	
SPECIMEN		1		2		3		4		5		6	
FK LNG MM		43		36		42		43		38		42	
STOM FULL %		40		50		75		50		30		60	
GILLS VOL MM**3		13.8		5.8		42.5		20.8		6.9		32.8	
DIG STATE		6		5		6		3		6		6	
PREY		NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %
UNSPECIFIED		ND	61.8	ND	53.9	ND	39.6	ND	86.1	ND	80.8	ND	60.2
INVERTEBRATES													
NEMATODA													
PARASITIC SPP	ADULTS									1	.4		
POLYCHAETA													
POLYCHAETA SPP	ADULTS												
OLIGOCHAETA													
OLIGOCHAETA SPP	ADULTS												
ACARINA													
ACARINA SPP	ADULTS												
CRUSTACEA													
CRUSTACEA SPP	ADULTS					1	.6						
OSTRACODA													
OSTRACODA SPP	ADULTS	9	.7	4	.8	18	.6			1	.4		
COPEPODA													
HARPACTICOIDA SPP	ADULTS	176	24.8	79	13.5	267	19.8	16	1.4	53	11.4	21	1.6
CIRRIPEDIA													
CIRRIPEDIA SPP	LARVAE					1	.2	1	.5	2	1.1		
CUMACEA													
CUMELLA SPP	ADULTS												
TANAIDACEA													
TANAIDALEA SPP	ADULTS	1	1.8	25	28.2	58	29.1			1	1.8	11	4.8
AMPHIPODA													
AMPHIPODA SPP	JUVENILES												
AMPHIPODA SPP	ADULTS					1	4.1						
CORophium SPP	ADULTS	6	6.8	1	6.7	3	1.2	8	8.6			39	31.2
AMPITHOE SPP	ADULTS					1	4.6						
DIPTERA													
DIPTERA SPP	LARVAE												
EPHYDRIDAE SPP	LARVAE	1	2.6										
MUSCIDAE SPP	LARVAE			2	2.5								
DOLICHOPODIDAE SPP	LARVAE	1	.5										
CERATOPOGONIDAE SPP	LARVAE	16	3.4	3	2.4	1	.3	8	3.4	11	5.7	3	.8
CHIRONOMIDAE SPP	LARVAE											1	1.4

Table F-1. (Concluded)

AREA: L SAND
SAMPLER: MS
SITE: 13
SAMPLE: 1

SPECIES:		2502		2502		2502		2502		2201		
SPECIMEN		7		8		9		10		11		
FK LNG MM		39		42		36		44		75		
STOM FULL %		50		80		60		75		15		
BOLUS VOL MM**3		13.8		59.3		13.9		64.0		15.6		
DIG STATE		5		7		7		9		5		
PREY		NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	MEAN VOL %
UNSPECIFIED		ND	68.5	ND	28.4	ND	57.8	ND	14.0	ND	64.8	55.2
INVERTEBRATES												
NEMATODA												
PARASITIC SPP	ADULTS											.0
POLYCHAETA												
POLYCHAETA SPP	ADULTS			423	68.9							6.3
OLIGOCHAETA												
OLIGOCHAETA SPP	ADULTS							334	85.8			7.8
ACARINA												
ACARINA SPP	ADULTS					1	.2			1	.4	.1
CRUSTACEA												
CRUSTACEA SPP	ADULTS											.1
OSTRACODA												
OSTRACODA SPP	ADULTS			6	.2	2	.3			27	4.7	.7
COPEPODA												
HARPACTICOIDA SPP	ADULTS	97	18.8	31	1.1	88	15.9			29	2.7	9.9
CIRRIPEDIA												
CIRRIPEDIA SPP	LARVAE			3	.3	1	.2					.2
CUMACEA												
CUMELLA SPP	ADULTS	10	3.8			2	1.8					.9
TANAIDACEA												
TANAIDACEA SPP	ADULTS	10	7.8	2	.2	8	5.0			51	21.4	6.2
AMPHIPODA												
AMPHIPODA SPP	JUVENILES					2	.8			2	1.4	.2
AMPHIPODA SPP	ADULTS											.4
CORophium SPP	ADULTS	5	2.9	4	.7	21	16.0					6.7
AMPITHOE SPP	ADULTS											.4
DIPTERA												
DIPTERA SPP	LARVAE			3	.2							.0
EPHYDRIDAE SPP	LARVAE											.2
MUSCIDAE SPP	LARVAE											.2
DOLICHOPODIDAE SPP	LARVAE											.0
CERATOPOGONIDAE SPP	LARVAE	1	1.8			7	3.0	1	.2	14	4.8	2.3
CHIRONOMIDAE SPP	LARVAE									1	1.3	.2

Table F-2. (Reference Table E-2)

AREA: N SEIN
SAMPLER: MS
SITE: 1
SAMPLE: 0181-140

SPECIES:			4491		1601		1601		1601		1601		1601	
SPECIMEN			1		2		3		4		5		6	
FK LNG MM			49		57		28		48		46		38	
SICM FULL %			78		100		98		85		80		75	
BOLUS VOL MM**3			13.8		512.8		5.8		6.9		45.0		5.8	
DIG STATE			7		6		5		4		4		3	
PREY		NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %
UNSPECIFIED		ND	35.8	ND	8.5	ND	65.6	ND	65.6	ND	54.9	ND	92.8
INVERTEBRATES													
PROTOZOA													
FORAMINIFERA SPP	ADULTS							1	4.1				
NEMATODA													
PARASITIC SPP	ADULTS												
POLYCHAETA													
POLYCHAETA SPP	ADULTS			ND	14.8								
ETEONE SPP	ADULTS												
NEANTHES LIMNICOLA	ADULTS			1	54.2								
CRUSTACEA													
CRUSTACEA SPP	JUVENILES												
COPEPODA													
CALANOIDA SPP	ADULTS	1	.5										
CYCLOPOIDA SPP	ADULTS												
HARPACTICOIDA SPP	ADULTS					19	20.8	2	1.6				
CUMACEA													
CUMACEA SPP	ADULTS												
HEMILEUCON SPP	ADULTS	18	68.8							1	2.0		
TANAIDACEA													
TANAIDACEA SPP	ADULTS											1	2.6
ISOPODA													
ISOPODA SPP	JUVENILES									1	.2		
AMPHIPODA													
AMPHIPODA SPP	ADULTS					1	10.9	1	16.4				
AMPHIPODA SPP	JUVENILES												
CORophium SPP	ADULTS	1	4.5					3	12.3	ND	26.6	1	1.5
ANISOGAMMARUS CONFERVICOLU	ADULTS			1	8.9					1	15.7		
AMPITHOE SPP	ADULTS												
DIPTERA													
DIPTERA SPP	PUPAE												
CERATOPOGONIDAE SPP	LARVAE					1	2.7						
CHIRONOMIDAE SPP	LARVAE			1	.1					2	.6	2	3.1
FISH													
UNIDENTIFIED	UNSPECIFIED												
COTTIDAE													
STAGHORN SCULPIN	UNSPECIFIED			1	13.5								

Table F-2. (Continued)

AREA: N SEIN
SAMPLER: MS
SITE: 1
SAMPLE: 0101-1401

SPECIES		1501		1601		4401		4401		4401		4401	
SPECIMEN		7		8		9		10		11		12	
FK LNG MM		30		32		38		42		37		38	
STOM FULL %		40		60		20		60		40		60	
BOLUS VOL MM**3		2.2		4.1		.8		9.8		4.8		5.9	
DIG STATE		4		6		1		3		4		4	
PREY		NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %
UNSPECIFIED		ND	75.9	ND	48.8	ND	100.0	ND	36.4	ND	16.9	ND	42.3
INVERTEBRATES													
PROTOZOA													
FORAMINIFERA SPP	ADULTS												
NEMATODA													
PARASITIC SPP	ADULTS												
POLYCHAETA													
POLYCHAETA SPP	ADULTS												
ETEONE SPP	ADULTS												
NEANTHES LIMNICOLA	ADULTS												
CRUSTACEA													
CRUSTACEA SPP	JUVENILES							1	.6				
COPEPODA													
CALANOIDA SPP	ADULTS							1	1.2				
CYCLOPOIDA SPP	ADULTS												
HARPACTICOIDA SPP	ADULTS	9	19.2	22	49.8								
CUMACEA													
CUMACEA SPP	ADULTS	1	2.6					ND	3.9				
MEMILEDION SPP	ADULTS							28	57.6	6	56.8	13	50.9
TANAIDACEA													
TANAIDACEA SPP	ADULTS			1	7.1					2	16.9		
ISOPODA													
ISOPODA SPP	JUVENILES												
AMPHIPODA													
AMPHIPODA SPP	ADULTS												
AMPHIPODA SPP	JUVENILES							1	.3				
COROPHIUM SPP	ADULTS												
ANISOGAMMARUS CONFERVICOLU	ADULTS												
AMPITHOE SPP	ADULTS												
DIPTERA													
DIPTERA SPP	PUPAE											1	6.8
CERATOPOGONIDAE SPP	LARVAE	1	1.3	2	3.1					1	7.4		
CHIRONOMIDAE SPP	LARVAE												
FISH													
UNIDENTIFIED	UNSPECIFIED												
COTTIDAE													
STAGHORN SCULPIN	UNSPECIFIED												

Table F-2. (Continued)

AREA: N SEIN
SAMPLER: RS
SITE: 1
SAMPLE: 0101-1401

SPECIES:			2502		2502		2502		4401		3401	2502
SPECIMEN			13		14		15		16		17	18
FK LNG MM			52		53		49		39		43	43
STOM FULL %			60		50		60		40		10	35
BOLUS VOL MM**3			12.2		5.8		9.3		1.8		.1	5.3
DIG STATE			2		8		7		3		1	1
PREY			NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	NUMB VOL %
UNSPECIFIED			ND	93.8	ND	12.8	ND	38.2	ND	75.8	ND 100.0	ND 51.8
INVERTEBRATES												
PROTOZOA												
FORAMINIFERA SPP		ADULTS										
NEMATODA												
PARASITIC SPP		ADULTS										1 1.8
POLYCHAETA												
POLYCHAETA SPP		ADULTS										
ETEONE SPP		ADULTS										
NEANTHES LIMNICOLA		ADULTS										
CRUSTACEA												
CRUSTACEA SPP		JUVENILES										
COPEPODA												
CALANOIDA SPP		ADULTS	2	5.8	8	8.9	1	1.5				
CYCLOPOIDA SPP		ADULTS										
HARPACTICOIDA SPP		ADULTS			2	1.3	1	.6				
CUMACEA												
CUMACEA SPP		ADULTS										
HEMILEUCON SPP		ADULTS			5	36.5	13	36.3	1	25.8		2 7.2
TANAIDACEA												
TANAIDACEA SPP		ADULTS										
ISOPODA												
ISOPODA SPP		JUVENILES										
AMPHIPODA												
AMPHIPODA SPP		ADULTS			3	38.5						
AMPHIPODA SPP		JUVENILES										
CORophium SPP		ADULTS					1	27.2				2 40.8
ANISOGAMMARUS CONFERVICOLU		ADULTS					1	4.2				
AMPITHOE SPP		ADULTS										
DIPTERA												
DIPTERA SPP		PUPAE										
CERATOPOGONIDAE SPP		LARVAE										
CHIRONOMIDAE SPP		LARVAE										
FISH												
UNIDENTIFIED		UNSPECIFIED										
COTTIDAE												
STAGHORN SCULPIN		UNSPECIFIED										

Table F-2. (Concluded)

AREA: N SEIN
SAMPLER: MS
SITE: 1
SAMPLE: 0181-1401

SPECIES:			4401		1601		1601		4401		3401		4401
SPECIMEN			19		28		21		22		23		24
FK LNG MM			42		61		44		40		45		39
STOM FULL %			65		98		90		45		18		80
BOLUS VOL MM**3			11.8		196.8		91.1		6.0		4.1		27.8
DIG STATE			1		2		5		6		5		6
PREY		NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	MEAN VOL %
UNSPECIFIED		ND	22.8	ND	61.6	ND	42.9	ND	108.6	ND	51.7	ND	43.7	55.1
INVERTEBRATES														
PROTOZOA														
FORAMINIFERA SPP	ADULTS													.2
NEMATODA														
PARASITIC SPP	ADULTS													.0
POLYCHAETA														
POLYCHAETA SPP	ADULTS													.6
ETEONE SPP	ADULTS					2	17.2							.7
NEANTHES LIMNICOLA	ADULTS													2.2
CRUSTACEA														
CRUSTACEA SPP	JUVENILES													.0
COPEPODA														
CALANOIDA SPP	ADULTS													.7
CYCLOPOIDA SPP	ADULTS											1	1.9	.1
HARPACTICOIDA SPP	ADULTS			1	.1	1	.2			1	3.5			3.9
CUMACEA														
CUMACEA SPP	ADULTS													.3
HEMILEUCON SPP	ADULTS	26	58.5							3	44.8	35	45.8	19.4
TANAIDACEA														
TAVAIDACEA SPP	ADULTS			1	.3	9	8.6							1.4
ISOPODA														
ISOPODA SPP	JUVENILES													.0
AMPHIPODA														
AMPHIPODA SPP	ADULTS			ND	5.2	2	5.7							3.1
AMPHIPODA SPP	JUVENILES													.0
COROPHIUM SPP	ADULTS	2	11.8			3	5.3							5.2
ANISOGAMMARUS CONFERVICOLU	ADULTS	1	8.6									2	6.6	1.8
AMPITHOE SPP	ADULTS					1	20.1							.8
DIPTERA														
DIPTERA SPP	PUPAE											1	1.1	.3
CERATOPOGONIDAE SPP	LARVAE											1	.9	.6
CHIRONOMIDAE SPP	LARVAE													.2
FISH														
UNIDENTIFIED	UNSPECIFIED			1	32.6									1.3
COTTIDAE														
STAGHORN SCULPIN	UNSPECIFIED													.5

AREA: N SEIN
SAMPLER: MS
SITE: 1
SAMPLE: 0101-1401

SPECIES:			4401		4401		
SPECIMEN			1		2		
FK LNG MM			41		43		
STOM FULL.%			55		63		
BOLUS VOL MM**3			4.2		3.8		
DIG STATE			5		7		
PREY		NUMB	VOL %	NUMB	VOL %	MEAN VOL %	
UNSPECIFIED		ND	63.6	ND	26.8	44.7	
INVERTEBRATES							
COPEPODA							
HARPACTICOIDA SPP	ADULTS	1	.1			.1	
CUMACEA							
HEMILEUCON SPP	ADULTS	14	29.8	17	71.8	50.8	
AMPHIPODA							
COROPHIUM SPP	ADULTS	1	2.8			1.4	
ANISOGAMMARUS CONFERVICOLU	ADULTS	1	5.8			2.5	
DIPTERA							
CERATOPOGONIDAE SPP	LARVAE	2	.5	2	3.8	1.8	

Table F-3. (Reference Table E-5)

SPECIES#				1601		2502		1601		3401		4401		4401		
SPECIMEN	AREA#	S SEIN		1		2		3		4		5		6		
FK LNG MM	SAMPLER#	LS		48		51		60		43		52		52		
STOM FULL %	SITE#	1		95		60		80		0		65		85		
BOLUS VOL MM**3	SAMPLE#	1		12.5		21.6		9.6		0		18.0		12.5		
DIG STATE				0		7		7		0		2		1		
PREY			NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %		
UNSPECIFIED			ND	16.8	ND	11.8	ND	15.8			ND	83.8	ND	84.7		
INVERTEBRATES																
POLYCHAETA																
AMPHARETIDAE SPP	ADULTS															
OSTRACODA																
OSTRACODA SPP	ADULTS															
COPEPODA																
HARPACTICOIDA SPP	ADULTS															
CUMACEA																
HEMILEUCON SPP	ADULTS		4	3.8	6	5.8										
AMPHIPODA																
COROPHIUM SPP	ADULTS		16	69.8												
ANISOGAMMARUS CONFERVICOLU	ADULTS		1	1.8	6	14.8	2	85.8								
ORTHOPTERA																
ORTHOPTERA SPP	ADULTS										2	1.8				
DIPTERA																
DIPTERA SPP	PUPAE										20	7.0	12	5.8		
DIPTERA SPP	ADULTS										11	8.8				
CERATOPOGONIDAE SPP	PUPAE												6	.5		
CERATOPOGONIDAE SPP	LARVAE												13	10.6		
PSYCHODIDAE SPP	ADULTS															
PSYCHODIDAE SPP	PUPAE															
HYMENOPTERA																
FORMICIDAE SPP	ADULTS										1	1.8	1	.8		
FISH																
UNIDENTIFIED FIS	LARVAE				7	78.8										

SPECIES#		1601		1601		4401		1601		
SPECIMEN		7		8		9		10		
FK LNG MM		27		31		49		21		
STOM FULL %		80		70		85		65		
BOLUS VOL MM**3		1.7		.9		4.8		.8		
DIG STATE		1		5		3		0		
PREY		NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	MEAN VOL %
UNSPECIFIED		ND	56.6	ND	46.8	ND	75.8	ND	100.0	54.6
INVERTEBRATES										
POLYCHAETA										
AMPHARETIDAE SPP	ADULTS	1	.6							.1
OSTRACODA										
OSTRACODA SPP	ADULTS			3	18.8					2.8
COPEPODA										
HARPACTICOIDA SPP	ADULTS			1	.2					.8
CUMACEA										
HEMILEUCON SPP	ADULTS			1	1.8	2	.6			1.1
AMPHIPODA										
COROPHIUM SPP	ADULTS	2	61.8	2	32.8	2	8.8			17.9
ANISOGAMMARUS CONFERVICOLU	ADULTS									11.1
ORTHOPTERA										
ORTHOPTERA SPP	ADULTS									.1
DIPTERA										
DIPTERA SPP	PUPAE					8	8.8			2.2
DIPTERA SPP	ADULTS									.9
CERATOPOGONIDAE SPP	PUPAE	1	3.8							.3
CERATOPOGONIDAE SPP	LARVAE					2	.5			.1
PSYCHODIDAE SPP	ADULTS					4	7.8			1.9
PSYCHODIDAE SPP	PUPAE	1	.1							.0
HYMENOPTERA										
FORMICIDAE SPP	ADULTS									.2
FISH										
UNIDENTIFIED	LARVAE									7.8

Table F-4. (Reference Table E-5)

AREA: S SEIN
SAMPLER: LS
SITE: 1
SAMPLE: 2

		4081	4001	4001	4001	4001	
SPECIES:							
SPECIMEN		1	2	3	4	5	
FK LNG MM		189	215	250	169	159	
STOM FULL %		40	78	55	30	75	
GOLUS VOL MM**3		42.8	66.0	378.0	19.0	116.5	
DIG STATE		0	3	0	5	1	
PREY		NUMB VOL %	NUMB VOL %	NUMB VOL %	NUMB VOL %	NUMB VOL %	MEAN VOL %
UNSPECIFIED		ND 26.8	ND 3.8	ND 2.8	ND 41.7	ND 99.8	34.5
INVERTEBRATES							
POLYCHAETA							
POLYCHAETA SPP	ADULTS		1 1.8				.2
ETEONE SPP	ADULTS				1 1.8		.2
GLYCERA SPP	ADULTS		1 3.8			1 .2	.6
CUMACEA							
HEMILEUCON SPP	ADULTS				1 .3		.1
AMPHIPODA							
CORDPHIUM SPP	ADULTS	38 63.8			2 2.0		14.2
ANISOGAMMARUS CONFERVICOLU	ADULTS	1 5.8			2 16.8		4.2
DECAPODA							
DECAPODA SPP	LARVAE		ND 93.8				18.6
CALLIANASSA SPP	ADULTS			1 98.0			19.6
DIPTERA							
TABANIDAE SPP	PUPAE				1 39.0		7.8

Table F-5. (Reference Table E-5)

AREA: S SEIN
SAMPLER: LS
SITE: 1
SAMPLE: 6

SPECIES#		4401		4401		4401		4401		4401		4401
SPECIMEN		1		2		3		4		5		6
FR LNG MM		43		42		47		51		52		56
STOM FULL %		80		85		80		95		92		97
BOLUS VOL MM**3		12.5		9.0		18.2		12.5		12.3		31.3
DIG STATE		3		4		3		2		5		8
PREY		NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %
UNSPECIFIED		ND	88.3	ND	61.8	ND	43.8	ND	69.8	ND	44.8	ND	7.1
INVERTEBRATES													
ARANEAE													
ARANEAE SPP	ADULTS	1	.8							1	1.8		
COPEPODA													
COPEPODA SPP	ADULTS	1	.2										
CALANOIDA SPP	ADULTS											1	.1
HARPACTICOIDA SPP	ADULTS												
MYSIDACEA													
MYSIDACEA SPP	ADULTS											2	2.5
AMPHIPODA													
COROPHIUM SPP	ADULTS											1	.2
DECAPODA													
DECAPODA SPP	LARVAE											1	.2
CARIDEA SPP	ADULTS												
COLLEMBOLA													
COLLEMBOLA SPP	ADULTS					1	1.8					1	1.8
HEMIPTERA													
HEMIPTERA SPP	ADULTS							ND	2.8			1	.1
COLEOPTERA													
COLEOPTERA SPP	LARVAE	1	.5										
COLEOPTERA SPP	ADULTS												
DIPTERA													
DIPTERA SPP	ADULTS											6	1.8
DIPTERA SPP	PUPAE	13	6.8	22	31.8	14	6.8	41	26.8	88	51.8	2	.2
DOLICHOPODIDAE SPP	LARVAE									1	1.8		
CERATOPOGONIDAE SPP	LARVAE	8	1.8	28	8.8								
CHIRONOMIDAE SPP	LARVAE	1	.5									1	.1
PSYCHODIDAE SPP	PUPAE					49	47.8						
PSYCHODIDAE SPP	LARVAE	6	1.5					3	2.8	29	2.8		
PSYCHODIDAE SPP	ADULTS			2	1.8	7	2.8			1	1.5	33	6.8
HYMENOPTERA													
HYMENOPTERA SPP	ADULTS					1	1.8					3	1.8
FORMICIDAE SPP	ADULTS	1	1.8					1	1.8				
FISH													
UNIDENTIFIED	LARVAE											34	80.5

Table F-5. (Concluded)

AREA: S SEIN
SAMPLER: LS
SITE: 1
SAMPLE: 4

SPECIES		4401		4401		4401		4401	
SPECIMEN		7		6		9		10	
FK LNG MM		42		59		55		45	
STOM FULL %		92		97		96		88	
BOLUS VOL MM**3		12.5		17.6		18.8		6.4	
DIG STATE		8		8		7		5	
PREY		NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	MEAN VOL %
UNSPECIFIED		ND	19.7	ND	8.8	ND	9.2	ND	78.9	42.6
INVERTEBRATES										
ARANEAE										
ARANEAE SPP	ADULTS									.2
COPEPODA										
COPEPODA SPP	ADULTS									.8
CALANOIDA SPP	ADULTS	1	.1							.0
HARPACTICOIDA SPP	ADULTS	1	.1							.0
MYSIDACEA										
MYSIDACEA SPP	ADULTS			2	1.8					.4
AMPHIPODA										
COROPHIUM SPP	ADULTS	1	.1			1	.1	3	6.8	.4
DECAPODA										
DECAPODA SPP	LARVAE									.8
CARIDEA SPP	ADULTS					1	.9			.1
COLLEMBOLA										
COLLEMBOLA SPP	ADULTS									.2
HEMIPTERA										
HEMIPTERA SPP	ADULTS									.2
COLEOPTERA										
COLEOPTERA SPP	LARVAE									.1
COLEOPTERA SPP	ADULTS							1	.8	.1
DIPTERA										
DIPTERA SPP	ADULTS	9	6.8					18	3.8	.8
DIPTERA SPP	PUPAE			4	1.8			21	13.8	13.4
DOLICHOPODIDAE SPP	LARVAE									.1
CERATOPOGONIDAE SPP	LARVAE									.9
CHIRONOMIDAE SPP	LARVAE	9	2.8			2	.2	9	1.8	.4
PSYCHODIDAE SPP	PUPAE	69	78.8							12.1
PSYCHODIDAE SPP	LARVAE									.6
PSYCHODIDAE SPP	ADULTS			6	2.8	4	3.8			1.5
HYMENOPTERA										
HYMENOPTERA SPP	ADULTS									.2
FORMICIDAE SPP	ADULTS							2	2.8	.4
FISH										
UNIDENTIFIED	LARVAE			36	88.8	27	88.8			25.6

Table F-6. (Reference Table E-6)

AREA: L SILT
SAMPLER: MS
SITE: 10
SAMPLE: 1

SPECIES:		2502		2502		2502		2502		2502	
SPECIMEN		1		2		3		4		5	
FK LNG MM		21		22		25		29		32	
STOM FULL %		80		0		50		60		80	
BOLUS VOL MM**3		5.4		0		2.8		22.0		27.0	
DIG STATE		3		8		7		4		4	
PREY		NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %
UNSPECIFIED		ND	68.2			ND	58.6	ND	51.3	ND	38.1
INVERTEBRATES											
OLIGOCHAETA											
OLIGOCHAETA SPP	ADULTS									1	4.5
GASTROPODA											
ALDERIA SPP	ADULTS							1	11.6	2	7.8
ACARINA											
ACARINA SPP	ADULTS					1	.4				
OSTRACODA											
OSTRACODA SPP	ADULTS					1	.8			6	2.2
COPEPODA											
HARPACTICOIDA SPP	ADULTS	41	29.4			38	8.6	7	1.3	29	3.7
CUMACEA											
HEMILEUCON SPP	ADULTS									1	3.8
ISOPODA											
GNORIMOSPHAEROMA LUTEA	ADULTS					2	17.8				
AMPHIPODA											
COROPHIUM SPP	ADULTS									2	15.8
DIPTERA											
DIPTERA SPP	PUPAE							1	1.9	1	1.9
MUSCIDAE SPP	LARVAE										
DOLICHOPODIDAE SPP	LARVAE					2	3.4				
CERATOPOGONIDAE SPP	LARVAE	3	11.4			12	19.4	29	22.4	27	37.6
PSYCHODIDAE SPP	LARVAE							7	11.5		
TIPULIDAE SPP	LARVAE									1	.4

SPECIES:		2502		2502		2502		2502		
SPECIMEN		7		8		9		10		
FK LNG MM		27		30		27		28		
STOM FULL %		65		75		75		90		
BOLUS VOL MM**3		5.8		21.9		9.3		24.4		
DIG STATE		5		3		6		5		
PREY		NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	MEAN VOL %
UNSPECIFIED		ND	68.2	ND	57.3	ND	69.4	ND	60.7	56.8
INVERTEBRATES										
OLIGOCHAETA										
OLIGOCHAETA SPP	ADULTS	5	7.3	1	.3			1	.3	1.4
GASTROPODA										
ALDERIA SPP	ADULTS			8	18.5			1	3.5	5.8
ACARINA										
ACARINA SPP	ADULTS	4	.6					1	.2	.1
OSTRACODA										
OSTRACODA SPP	ADULTS			1	.6			3	.5	.5
COPEPODA										
HARPACTICOIDA SPP	ADULTS	31	5.7	8	.3	37	4.9	44	3.5	6.8
CUMACEA										
HEMILEUCON SPP	ADULTS									.4
ISOPODA										
GNORIMOSPHAEROMA LUTEA	ADULTS									1.9
AMPHIPODA										
COROPHIUM SPP	ADULTS									1.7
DIPTERA										
DIPTERA SPP	PUPAE									.4
MUSCIDAE SPP	LARVAE									.1
DOLICHOPODIDAE SPP	LARVAE					2	1.3			.5
CERATOPOGONIDAE SPP	LARVAE	9	4.6	51	22.7	21	24.4	50	31.3	21.3
PSYCHODIDAE SPP	LARVAE	2	2.3	1	.3					1.6
TIPULIDAE SPP	LARVAE	3	11.3							1.4

Table F-7. (Reference Table E-8)

AREA: IM MI
SAMPLER: MS
SITE: 1
SAMPLE: 1

SPECIES:		2502		2502		2502		2502		2502		2502
SPECIMEN		1		2		3		4		5		6
FK LNG MM		48		62		58		52		55		60
STOM FULL %		20		15		20		15		5		30
BOLUS VOL MM**3		17.6		21.9		17.6		8.8		1.8		32.8
DIG STATE		8		5		8		7		7		7
PREY		NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB VOL %
UNSPECIFIED		ND	8.8	ND	49.8	ND	6.8	ND	62.1	ND	47.8	ND 5.8
INVERTEBRATES												
OLIGOCHAETA												
OLIGOCHAETA SPP	ADULTS					1	1.5					
COPEPODA												
CALANOIDA SPP	ADULTS	274	98.8	135	39.2	185	84.6	41	34.5	21	43.8	131 50.0
HARPACTICOIDA SPP	ADULTS	13	1.8	87	7.5	32	4.8	10	3.4	6	5.8	43 3.3
AMPHIPODA												
AMPHIPODA SPP	ADULTS											
ANISOGAMMARUS CONFERVICOLU	ADULTS	1	1.8	5	2.7	3	3.1			1	5.8	7 41.7
DIPTERA												
DIPTERA SPP	LARVAE			1	1.6							

SPECIES:		1501			
SPECIMEN		7			
FK LNG MM		76			
STOM FULL %		50			
BOLUS VOL MM**3		12.5			
DIG STATE		2			
PREY		NUMB	VOL %	MEAN VOL %	
UNSPECIFIED		ND	33.4	30.2	
INVERTEBRATES					
OLIGOCHAETA					
OLIGOCHAETA SPP	ADULTS			.2	
COPEPODA					
CALANOIDA SPP	ADULTS			48.8	
HARPACTICOIDA SPP	ADULTS			3.5	
AMPHIPODA					
AMPHIPODA SPP	ADULTS	ND	33.3	4.8	
ANISOGAMMARUS CONFERVICOLU	ADULTS	2	33.3	12.4	
DIPTERA					
DIPTERA SPP	LARVAE			.2	

Table F-8. (Reference Table E-9)

AREA: MAT MI
SAMPLER: MS
SITE: 15
SAMPLE: 1

SPECIES:		2502		2502		2502		2502		2502		2502	
SPECIMEN		1		2		3		4		5		6	
FK LNG MM		39		38		45		41		46		43	
STOM FULL %		30		40		45		25		20		5	
BOLUS VOL MM**3		3.4		5.8		22.8		8.0		5.8		.1	
DIG STATE		1		1		2		2		2		1	
PREY		NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %
UNSPECIFIED		ND	99.8	ND	99.8	ND	97.8	ND	98.0	ND	60.8	ND	99.9
INVERTEBRATES													
NEMATODA													
PARASITIC SPP	ADULTS	2	1.8										
COPEPODA													
CALANOIDA SPP	ADULTS							1	2.5				
HARPACTICOIDA SPP	ADULTS			1	.3			13	3.5				
HEMIPTERA													
HEMIPTERA SPP	NYMPHS							2	4.8				
HEMIPTERA SPP	ADULTS					1	1.8						
DIPTERA													
DIPTERA SPP	ADULTS												
EPHYDRIDAE SPP	LARVAE												
CERATOPOGONIDAE SPP	LARVAE												
CHIRONOMIDAE SPP	LARVAE			1	.8	5	2.8			3	40.8		

SPECIES:		2502		2502		2502		2502		
SPECIMEN		7		8		9		10		
FK LNG MM		37		42		36		48		
STOM FULL %		15		70		50		10		
BOLUS VOL MM**3		1.8		15.6		5.8		.3		
DIG STATE		2		3		2		1		
PREY		NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	MEAN VOL %
UNSPECIFIED		ND	75.8	ND	43.8	ND	98.6	ND	100.0	86.1
INVERTEBRATES										
NEMATODA										
PARASITIC SPP	ADULTS					5	.5			.2
COPEPODA										
CALANOIDA SPP	ADULTS					5	.6			.3
HARPACTICOIDA SPP	ADULTS			25	6.8					1.0
HEMIPTERA										
HEMIPTERA SPP	NYMPHS									.4
HEMIPTERA SPP	ADULTS									.1
DIPTERA										
DIPTERA SPP	ADULTS			1	43.0					4.3
EPHYDRIDAE SPP	LARVAE	1	25.8							2.5
CERATOPOGONIDAE SPP	LARVAE			1	.5					.1
CHIRONOMIDAE SPP	LARVAE			9	7.5	3	.3			5.1

Table F-9. (Reference Table E-10)

AREA: MAT MI
SAMPLER: MS
SITE: 15
SAMPLE: 2

SPECIES:				1601		2502		1601		1601		1601		2502	
SPECIMEN				1		2		3		4		5		6	
FK LNG MM				69		58		65		57		60		54	
STOM FULL %				92		70		65		40		45		30	
BOLUS VOL MM**3				13.7		.4		6.4		.9		9.0		.8	
DIG STATE				7		0		1		0		9		1	
PREY			NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	
UNSPECIFIED			ND	21.8	ND	100.0	ND	98.8	ND	99.5	ND	2.0	ND	96.0	
INVERTEBRATES															
NEMATODA															
NEMATODA SPP	ADULTS														
OLIGOCHAETA															
OLIGOCHAETA SPP	ADULTS														
COPEPODA															
CALANOIDA SPP	ADULTS						7	1.0	1	.2			35	1.0	
HARPACT COIDA SPP	ADULTS								3	.4			174	3.0	
ISOPODA															
GNORIMOSPHAEROMA LUTEA	ADULTS										1	98.0			
AMPHIPODA															
TALITRIDAE SPP	ADULTS		1	5.0											
DIPTERA															
CHIRONOMIDAE SPP	LARVAE						1	1.0							
CHIRONOMIDAE SPP	ADULTS														
FISH															
UNIDENTIFIED FIS EGGS			39	74.8											

SPECIES:			1601		2502		2502		2502	
SPECIMEN			7		8		9		10	
FK LNG MM			54		54		53		55	
STOM FULL %			92		85		80		70	
BOLUS VOL MM**3			1.8		.9		4.8		3.6	
DIG STATE			2		8		8		7	
PREY		NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	MEAN VOL %
UNSPECIFIED		ND	96.6	ND	4.0	ND	7.8	ND	42.7	56.7
INVERTEBRATES										
NEMATODA										
NEMATODA SPP	ADULTS							1	.1	.0
OLIGOCHAETA										
OLIGOCHAETA SPP	ADULTS							1	.2	.0
COPEPODA										
CALANOIDA SPP	ADULTS	40	1.3	1256	96.8	1992	92.0	293	7.0	19.9
HARPACTICOIDA SPP	ADULTS	96	2.8			8	1.8	59	3.0	.9
ISOPODA										
GNORIMOSPHAEROMA LUTEA	ADULTS									9.8
AMPHIPODA										
TALITRIDAE SPP	ADULTS									.5
DIPTERA										
CHIRONOMIDAE SPP	LARVAE	1	.1					14	65.0	4.6
CHIRONOMIDAE SPP	ADULTS							1	2.0	.2
FISH										
UNIDENTIFIED	EGGS									7.4

Table F-10. (Reference Table E-11)

AREA: L SILT
SAMPLER: MS
SITE: 2
SAMPLE: 1

SPECIES:		1601		1601		1601		1601		1601		1601	
SPECIMEN		1		2		3		4		5		6	
FK LNG MM		42		58		57		52		42		38	
STOM FULL %		90		45		65		48		60		40	
BOLUS VOL MM**3		89.2		38.5		195.1		27.0		32.8		15.6	
DIG STATE		7		8		3		2		5		2	
PREY		NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %
UNSPECIFIED		ND	17.3	ND	17.0	ND	55.4	ND	79.0	ND	40.4	ND	85.7
INVERTEBRATES													
POLYCHAETA													
AMPHARETIDAE SPP	ADULTS												
ACARINA													
ACARINA SPP	ADULTS												
OSTRACODA													
OSTRACODA SPP	ADULTS												
COPEPODA													
CALANOIDA SPP	ADULTS												
HARPACTICOIDA SPP	ADULTS												
CUMACEA													
HEMILEUCON SPP	ADULTS	1	2.8										
ISOPODA													
GNORIMOSPHAEROMA LUTEA	ADULTS			1	16.8					1	16.2		
AMPHIPODA													
AMPHIPODA SPP	ADULTS	1	.3			ND	11.4	ND	2.5			ND	14.3
COROPHIUM SPP	ADULTS	34	78.8										
ANISOGAMMARUS CONFERVICOLU	ADULTS	3	1.4	4	54.3	9	32.2	1	14.8	3	40.4		
DIPTERA													
DIPTERA SP	PUPAE												
CERATOPOGONIDAE SPP	LARVAE			4	8.5								
CHIRONOMIDAE SPP	LARVAE	3	1.8	3	4.2	3	1.8	2	3.7	4	3.8		
PSYCHODIDAE SPP	LARVAE												
TIPULIDAE SPP	LARVAE												

SPECIES:		1601		1601		1601		1601		2502		2502	
SPECIMEN		7		8		9		10		11		12	
FK LNG MM		37		29		26		23		30		44	
STOM FULL %		65		40		83		60		75		80	
BOLUS VOL MM**3		21.8		4.1		19.7		3.4		6.9		46.8	
DIG STATE		5		6		8		8		6		5	
PREY		NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %
UNSPECIFIED		ND	43.3	ND	44.8	ND	3.8	ND	7.5	ND	28.3	ND	38.2
INVERTEBRATES													
POLYCHAETA													
AMPHARETIDAE SPP	ADULTS												
ACARINA													
ACARINA SPP	ADULTS											1	.3
OSTRACODA													
OSTRACODA SPP	ADULTS	1	.2									2	.3
COPEPODA													
CALANOIDA SPP	ADULTS												
HARPACTICLIDA SPP	ADULTS	1	.2			3	2.8	2	.8	91	18.9	10	.4
CUMACEA													
HEMILEUCON SPP	ADULTS											1	.8
ISOPODA													
GNORIMOSPHAEROMA LUTEA	ADULTS			1	18.4								
AMPHIPODA													
AMPHIPODA SPP	ADULTS												
COROPHIUM SPP	ADULTS					12	95.8	4	91.7	1	4.3	3	8.5
ANISOGAMMARUS CONFERVICOLU	ADULTS	2	26.8	1	26.9							1	7.4
DIPTERA													
DIPTERA SPP	PUPAE									1	7.4	15	24.1
CERATOPOGONIDAE SPP	LARVAE	12	31.3	3	17.9					22	48.8	23	16.3
CHIRONOMIDAE SPP	LARVAE												
PSYCHODIDAE SPP	LARVAE											1	1.3
TIPULIDAE SPP	LARVAE									1	1.1		

Table F-10. (Concluded)

AREA: L SILT
SAMPLER: MS
SITE: 2
SAMPLE: 1

SPECIES			25OZ		25OZ	
SPECIMEN			13		14	
FK LNG MM			36		48	
STOM FULL %			50		80	
BOLUS VOL MM**3			5.8		125.0	
DIG STATE			7		6	
PREY		NUMB	VOL %	NUMB	VOL %	MEAN VOL %
UNSPECIFIED		ND	49.8	ND	24.8	37.6
INVERTEBRATES						
POLYCHAETA						
AMPHARETIDAE SPP	ADULTS			7	33.8	2.4
ACARINA						
ACARINA SPP	ADULTS					.0
OSTRACODA						
OSTRACODA SPP	ADULTS			2	.1	.0
COPEPODA						
CALANOIDA SPP	ADULTS			1	.2	.0
HARPACTICOIDA SPP	ADULTS	32	9.2	7	.3	2.3
CUMACEA						
HEMILEUCON SPP	ADULTS					.2
ISOPODA						
SPHORIMOSPHAEROMA LUTEA	ADULTS					3.0
AMPHIPODA						
AMPHIPODA SPP	ADULTS			ND	6.2	2.5
COROPHIUM SPP	ADULTS			7	20.6	21.3
ANISOGAMMARUS CONFERVICOLU	ADULTS	2	28.5	5	11.4	17.4
DIPTERA						
DIPTERA SPP	PUPAE			1	1.0	2.3
CERATOPOGONIDAE SPP	LARVAE	4	12.5			9.7
CHIRONOMIDAE SPP	LARVAE					.9
PSYCHODIDAE SPP	LARVAE					.1
TIPULIDAE SPP	LARVAE			1	2.3	.2

Table F-11. (Reference Table E-12)

CREAM L SILT
SAMPLER: MS
SITE: 2
SAMPLE: 2

SPECIES:		2502		2502		2502		2502		2502		2502	
SPECIMEN		1		2		3		4		5		6	
FK LNG MM		25		28		32		27		22		34	
STOM FULL %		60		75		40		60		80		75	
BOLUS VOL MM**3		4.9		10.7		35.9		6.9		4.9		17.6	
DIG STATE		4		5		8		5		5		7	
PREY		NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %
UNSPECIFIED		ND	73.8	ND	69.5	ND	7.8	ND	51.7	ND	77.2	ND	34.3
INVERTEBRATES													
POLYCHAETA													
POLYCHAETA SPP	ADULTS			2	3.8								
OLIGOCHAETA													
OLIGOCHAETA SPP	ADULTS									2	6.4		
GASTROPODA													
ALDERIA SPP	ADULTS											2	2.5
ARANEAE													
ARANEAE SPP	ADULTS												
ACARINA													
ACARINA SPP	ADULTS									1	.4	1	.1
OSTRACODA													
OSTRACODA SPP	ADULTS			4	2.8			5	2.8	2	.6		
COPEPODA													
HARPACTICOIDA SPP	ADULTS	18	11.2	61	13.4	7	.4	79	11.5	32	10.3	63	3.7
CIRRIPEDIA													
CIRRIPEDIA SPP	LARVAE							3	1.9				
ISOPODA													
GNORIMOSPHAEROMA LUTEA	ADULTS												
AMPHIPODA													
AMPHIPODA SPP	ADULTS												
COROPHIUM SPP	ADULTS	3	5.7										
AMISOGAMMARUS CONFERVICOLU	ADULTS	1	2.3			5	5.3						
TALITRIDAE SPP	ADULTS					1	1.4	1	6.3				
INSECTA													
INSECTA SPP	LARVAE					1	1.4						
HOMOPTERA													
APHIDIDAE SPP	ADULTS												
DIPTERA													
DIPTERA SPP	PUPAE											2	3.7
MUSCIDAE SPP	LARVAE	1	6.2	1	4.5			1	.8				
DOLICHOPODIDAE SPP	LARVAE												
CERATOPOGONIDAE SPP	LARVAE	1	.6	4	3.7			20	11.9	8	5.1	29	53.9
CHIRONOMIDAE SPP	LARVAE			2	3.0	92	83.7						
TIPULIDAE SPP	LARVAE							2	13.9			1	1.8

Table F-11. (Continued)

AREA# L SILT
SAMPLER# MS
SITE# 2
SAMPLE# 2

SPECIES#		2502		2502		2502		2502		1601		1601		
SPECIMEN		7		8		9		10		11		12		
FX LNG MM		41		25		30		29		76		36		
STOM FULL %		75		70		65		75		75		85		
BODY VOL MM**3		79.5		13.8		9.3		8.8		195.1		22.8		
DIG STATE		5		4		5		7		7		6		
PREY		NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	
UNSPECIFIED		ND	50.8	ND	66.3	ND	60.3	ND	32.8	ND	38.8	ND	11.5	
INVERTEBRATES														
POLYCHAETA														
POLYCHAETA SPP	ADULTS													
OLIGOCHAETA														
OLIGOCHAETA SPP	ADULTS	10	9.8	4	2.9	3	2.3							
GASTROPODA														
ALDERIA SPP	ADULTS	6	17.3	2	1.5			4	8.8					
ARANEAE														
ARANEAE SPP	ADULTS	1	.7											
ACARINA														
ACARINA SPP	ADULTS					2	.5							
OSTRACODA														
OSTRACODA SPP	ADULTS					3	1.2	1	.5			1	2.3	
COPEPODA														
HARPACTICOIDA SPP	ADULTS	7	.3	158	17.2	39	4.2	36	5.8					
CIRRIPEDIA														
CIRRIPEDIA SPP	LARVAE													
ISOPODA														
GNORIMOSPHAEROMA LUTEA	ADULTS									6	34.2	3	13.8	
AMPHIPODA														
AMPHIPODA SPP	ADULTS									ND	1.7			
COROPHIUM SPP	ADULTS											4	34.6	
AMISOGAMMARUS CONFERVICOLU	ADULTS	3	4.1					1	7.1	19	34.1	1	38.6	
TALITRIDAE SPP	ADULTS													
INSECTA														
INSECTA SPP	LARVAE													
HOMOPTERA														
APHIDIDAE SPP	ADULTS					6	9.3							
DIPTERA														
DIPTERA SPP	PUPAE	1	1.8											
MUSCIDAE SPP	LARVAE					1	2.3							
COLICHOPODIDAE SPP	LARVAE			1	.5			1	5.8					
CERATOPOGONIDAE SPP	LARVAE	15	5.6	15	3.7	7	6.8	21	27.7					
CHIRONOMIDAE SPP	LARVAE	2	.9					1	.5					
TIPULIDAE SPP	LARVAE	1	.3	2	7.9	2	13.9	2	12.6					

Table F-11. (Concluded)

AREA: L SILL
SAMPLER: MS
SITE: 2
SAMPLE: 2

SPECIES:			1601		1601		1601		
SPECIMEN			13		14		15		
FK LNG MM			34		38		34		
STOM FULL %			80		25		88		
BOLUS VOL MM**3			10.0		1.0		9.5		
DIG STATE			9		8		8		
PREY		NUMB	VOL %	NUMB	VOL %	NUMB	VOL %		MEAN VOL %
UNSPECIFIED		ND	18.7	ND	43.8	ND	21.7		43.3
INVERTEBRATES									
POLYCHAETA									
POLYCHAETA SPP	ADULTS								.3
OLIGOCHAETA									
OLIGOCHAETA SPP	ADULTS								1.4
GASTROPODA									
ALVERIA SPP	ADULTS								2.0
ARANEAE									
ARANEAE SPP	ADULTS								.0
ACARINA									
ACARINA SPP	ADULTS								.1
OSTRACODA									
OSTRACODA SPP	ADULTS	3	5.0						.9
COPEPODA									
HARPACTICOIDA SPP	ADULTS	3	.7	2	1.2				5.3
CIRRIPEDIA									
CIRRIPEDIA SPP	LARVAE								.1
ISOPODA									
GNORIMOSPHAEROMA LUTEA	ADULTS	4	12.4	2	25.0	2	3.3		5.9
AMPHIPODA									
AMPHIPODA SPP	ADULTS	ND	21.4			ND	4.3		1.8
COROPHIUM SPP	ADULTS			1	5.0				3.1
ANISOGAMMARUS CONFERVICOLU	ADULTS	1	43.8			3	60.7		13.5
TALITRIDAE SPP	ADULTS								.5
INSECTA									
INSECTA SPP	LARVAE								.1
HOMOPTERA									
APHIDIDAE SPP	ADULTS								.6
DIPTERA									
DIPTERA SPP	PUPAE								.3
MUSCIDAE SPP	LARVAE								.9
DOLICHOPODIDAE SPP	LARVAE								.4
CERATOPOGONIDAE SPP	LARVAE			1	25.0	2	5.7		10.0
CHIRONOMIDAE SPP	LARVAE								5.9
TIPULIDAE SPP	LARVAE					1	4.3		3.6

Table F-12. (Reference Table E-13)

AREA: SEDGE
SAMPLER: SS
SITE: 2
SAMPLE: 1

SPECIES:		1601		1601		1601		1601		1601	1601
SPECIMEN		1		2		3		4		5	6
FK LNG MM		48		47		47		53		25	52
STOM FULL %		75		75		50		75		50	50
BOLUS VOL MM**3		27.0		42.9		46.7		91.1		.5	14.0
DIG STATE		8		3		3		2		4	2
PREY		NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %
UNSPECIFIED		ND	28.8	ND	46.4	ND	49.1	ND	60.0	ND	95.0	ND	88.8
INVERTEBRATES													
ACARINA													
ACARINA SPP	ADULTS	2	1.8										
COPEPODA													
HARPACTICOIDA SPP	ADULTS	1	.5			1	.2			1	5.0		
ISOPODA													
GNORIMOSPHAEROMA LUTEA	ADULTS	1	33.8			1	49.1	2	40.0				
AMPHIPODA													
AMPHIPODA SPP	ADULTS												
CORCPHIUM SPP	ADULTS	3	37.0	1	11.6								
TALITRIDAE SPP	ADULTS			1	34.8								
DIPTERA													
DIPTERA SPP	LARVAE											1	18.8
DIPTERA SPP	ADULTS			1	2.9								
CERATOPOGONIDAE SPP	LARVAE	1	.5	3	4.3	4	1.6					9	2.0

SPECIES:		1601		1601							
SPECIMEN		7		8							
FK LNG MM		54		47							
STOM FULL %		100		30							
BOLUS VOL MM**3		123.0		8.0							
DIG STATE		6		7							
PREY		NUMB	VOL %	NUMB	VOL %	MEAN VOL %					
UNSPECIFIED		ND	55.8	ND	9.0	53.8					
INVERTEBRATES											
ACARINA											
ACARINA SPP	ADULTS					.1					
COPEPODA											
HARPACTICOIDA SPP	ADULTS					.7					
ISOPODA											
GNORIMOSPHAEROMA LUTEA	ADULTS					15.3					
AMPHIPODA											
AMPHIPODA SPP	ADULTS	ND	22.0	ND	89.0	13.9					
CORCPHIUM SPP	ADULTS	4	22.0			8.8					
TALITRIDAE SPP	ADULTS					4.3					
DIPTERA											
DIPTERA SPP	LARVAE					1.3					
DIPTERA SPP	ADULTS					.4					
CERATOPOGONIDAE SPP	LARVAE	5	1.8	1	2.0	1.4					

Table F-13. (Reference Table E-14)

AREA: SEDGE
SAMPLER: MS
SITE: 17
SAMPLE: 361

SPECIES:		2502		2502		2502		2502		2502		2502	
SPECIMEN		1		2		3		4		5		6	
FK LNG MM		31		36		31		35		32		34	
STOM FULL %		40		100		75		60		85		70	
BOLUS VOL MM**3		15.6		32.8		10.6		21.9		35.9		19.7	
DIG STATE		8		4		3		4		7		7	
PREY		NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %
UNSPECIFIED		ND	25.8	ND	62.0	ND	65.4	ND	93.2	ND	71.7	ND	54.6
INVERTEBRATE													
NEMATODA													
NEMATODA SPP	ADULTS							2	.3				
POLYCHAETA													
AMPHARETIDAE SPP	ADULTS			1	3.8								
GASTROPODA													
ALDERIA SPP	ADULTS											4	1.8
ARANEAE													
ARANEAE SPP	ADULTS												
ACARINA													
ACARINA SPP	ADULTS												
BRANCHIOPODA													
CLADOCERA SPP	ADULTS	1	.3	2	.3	9	2.0	2	.5				
PODON SPP	ADULTS	1	.3										
EVADNE SPP	JUVENILES	2	.5										
OSTRACODA													
OSTRACODA SPP	ADULTS			27	3.8	47	5.0						
COPEPODA													
CALANOIDA SPP	ADULTS							2	.6	1	.1		
HARPACTICOIDA SPP	ADULTS	24	3.8	89	3.8	58	4.7	89	4.4	26	1.7	225	28.2
CIRRIPEDIA													
CIRRIPEDIA SPP	LARVAE			29	5.8	54	15.1	2	.5				
CUMACEA													
CUMACEA SPP	ADULTS												
ISOPODA													
GNORIMOSPHAEROMA LUTEA	ADULTS												
AMPHIPODA													
CORophium SPP	ADULTS			1	1.4							4	7.1
ANISOGAMMARUS CONFERVICOLU	ADULTS												
TALITRIDAE SPP	JUVENILES												
INSECTA													
INSECTA SPP	LARVAE					1	7.6						
DIPTERA													
DIPTERA SPP	LARVAE	5	2.8							4	.8		
EPHYDRIDAE SPP	LARVAE											5	4.7
MUSCIDAE SPP	LARVAE												
DOLICHOPODIDAE SPP	LARVAE											2	.9
CERATOPOGONIDAE SPP	LARVAE	24	69.8	18	2.3	1	.2	3	.5	12	5.1	36	10.7
TIPULIDAE SPP	LARVAE									4	28.3		

Table F-13. (Concluded)

SPECIES:		2502	2502	2502	2502	1601	1601	1601	
SPECIMEN	AREA: SEDGE	7	8	9	10	11	12	13	
FK LNG MM	SAMPLE: MS	31	32	22	27	115	114	85	
STOM FULL %	SITE: 17	50	60	60	90	40	75	65	
BOLUS VOL MM**3	SAMPLE: 301	15.6	21.9	4.9	19.7	421.9	571.7	143.9	
DIG STATE		3	5	7	5	7	5	3	
PREY		NUMB VOL %	NUMB VOL %	NUMB VOL %	NUMB VOL %	NUMB VOL %	NUMB VOL %	NUMB VOL %	MEAN VOL %
Unidentified		ND 94.8	ND 77.8	ND 92.8	ND 83.2	ND 90.4	ND 82.7	ND 98.8	73.9
INVERTEBRATES									
NEMATODA									
NEMATODA SPP	ADULTS	13 .8							.1
POLYCHAETA									
AMPHARETIDAE SPP	ADULTS								.2
GASTROPODA									
ALUERIA SPP	ADULTS		5 1.8		2 .4				.3
ARANEAE									
ARANEAE SPP	ADULTS	1 .4							.0
ACARINA									
ACARINA SPP	ADULTS				1 .7				.1
BRANCHIOPODA									
CLADOCERA SPP	ADULTS	20 1.6	3 .5	9 2.2	5 .7				.6
PODON SPP	ADULTS								.0
EVADNE SPP	JUVENILES								.0
OSTRACODA									
OSTRACODA SPP	ADULTS				2 .6		3 .1		.7
COPEPODA									
CALANOIDA SPP	ADULTS	3 .5	1 .2	17 2.9					.3
HARPACTICOIDA SPP	ADULTS	107 6.0	142 14.7	216 29.2	218 12.6	1 .1	1 .1		7.7
CIRRIPEDIA									
CIRRIPEDIA SPP	LARVAE	4 1.1							1.7
CUMACEA									
CUMACEA SPP	ADULTS		1 .6						.0
ISOPODA									
SPHAEROMA LUTEA	ADULTS					1 3.7	6 12.2		1.2
AMPHIPODA									
CORophium SPP	ADULTS		3 1.8	1 1.8	1 2.1		4 4.4	7 5.8	1.4
ANISOGAMMARUS CONFERVICOLU	ADULTS					1 3.7			.3
TALITRIDAE SPP	JUVENILES		1 2.4						.2
INSECTA									
INSECTA SPP	LARVAE								.6
DIPTERA									
DIPTERA SPP	LARVAE			1 .2					.2
EPHYDRIDAE SPP	LARVAE					1 1.5			.5
MUSCIDAE SPP	LARVAE				1 .9				.1
DOLICHOPODIDAE SPP	LARVAE				1 .5				.1
CERATOPOGONIDAE SPP	LARVAE	4 .4	2 .5	15 11.7	2 2.8	1 .3	27 .5		8.0
TIPULIDAE SPP	LARVAE								1.6

Table F-14. (Reference Table E-14)

AREA: SEDGE
SAMPLER: MS
SITE: 17
SAMPLE: 861

		1601	2201	2502	
SPECIES:					
SPECIMEN		1	2	3	
FK LNG MM		90	75	29	
STOM FULL X		98	78	65	
BOLUS VOL MM**3		20.0	20.0	2.3	
DIG STATE		7	4	2	
PREY		NUMB VOL X	NUMB VOL X	NUMB VOL X	MEAN VOL X
UNSPECIFIED		ND 35.8	ND 73.4	ND 62.9	57.4
INVERTEBRATES					
NEMATODA					
NEMATODA SPP	ADULTS			1 .1	.0
BRANCHIOPODA					
EVADNE SPP	ADULTS		1 .5		.2
COPEPODA					
HARPACTICOIDA SPP	ADULTS			13 2.8	.7
ISOPODA					
GNORIMOSPHAEROMA LUTEA	ADULTS		1 3.0		1.0
AMPHIPODA					
COROPHIUM SPP	ADULTS	4 13.0	5 1.0	9 4.0	6.0
AMISOGAMMARUS CONFERVICOLU	ADULTS	9 92.0	5 22.0	6 26.0	33.3
DIPTERA					
DIPTERA SPP	LARVAE		1 .1		.0
CERATOPOGONIDAE SPP	LARVAE			8 4.8	1.3

Table F-15. (Reference Table E-15)

AREA: MAT MI
SAMPLER: AS
SITE: 14
SAMPLE: 281

SPECIES:		2502		2502		2502		2502		2502		2502	
SPECIMEN		1		2		3		4		5		6	
FK LNG MM		38		48		54		48		36		36	
STOM FULL %		80		80		60		60		75		65	
BOLUS VOL MM**3		19.7		23.2		9.0		10.7		21.9		6.8	
DIG STATE		7		3		6		6		5		8	
PREY		NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %
UNSPECIFIED		ND	35.8	ND	67.9	ND	24.1	ND	36.9	ND	51.8	ND	30.8
INVERTEBRATES													
PROTOZOA													
FORAMINIFERA SPP	ADULTS											1	.1
NEMATODA													
PARASITIC SPP	ADULTS			5	.3								
POLYCHAETA													
POLYCHAETA SPP	ADULTS	3	5.2							14	12.8		
AMPHARETIDAE SPP	ADULTS	2	5.7	4	16.2					5	10.6		
OLIGOCHAETA													
OLIGOCHAETA SPP	ADULTS												
GASTROPODA													
GASTROPODA SPP	ADULTS												
ARTHROPODA													
ARTHROPODA SPP	JUVENILES							3	.1				
ACARINA													
ACARINA SPP	ADULTS												
OSTRACODA													
OSTRACODA SPP	ADULTS							2	.5				
COPEPODA													
CALANOIDA SPP	ADULTS							6	1.1				
HARPACTICOIDA SPP	ADULTS	19	2.5	112	9.3	1	.1	172	27.7	24	2.1	268	40.8
CIRRIPEDIA													
CIRRIPEDIA SPP	LARVAE							1	.4			16	18.8
CUMACEA													
CUMACEA SPP	ADULTS												
HEMILEUCON SPP	ADULTS	1	1.5	1	.8					1	2.1		
TANAIDACEA													
TANAIDACEA SPP	ADULTS	27	20.8	4	1.8	7	5.7			31	17.8		
AMPHIPODA													
AMPHIPODA SPP	JUVENILES	2	2.8										
COROPHIUM SPP	ADULTS	11	21.3	2	3.7	3	15.4	2	20.8	3	3.6	1	1.5
ANISOGAMMARUS CONFERVICOLU	ADULTS											1	4.9
AMPITHOE SPP	ADULTS					1	19.8	2	12.5				
INSECTA													
INSECTA SPP	ADULTS												
HOMOPTERA													
CICADELLIDAE SPP	ADULTS												
APHIDIDAE SPP	ADULTS					1	.7						
DIPTERA													
DIPTERA SPP	PUPAE	1	.7										
MUSCIDAE SPP	LARVAE					1	24.1						
DOLICHOPODIDAE SPP	LARVAE	1	3.3			1	7.8						
CERATOPOGONIDAE SPP	LARVAE	2	.8							1	.4		
CHIRONOMIDAE SPP	LARVAE	4	2.8							1	.4		
TIPULIDAE SPP	LARVAE					11	3.1						
MYCETOPHILIDAE SPP	LARVAE												
HYMENOPTERA													
HYMENOPTERA SPP	ADULTS												

Table F-15. (Concluded)

AREA: MAT MI
SAMPLER: MS
SITE: 14
SAMPLE: 201

SPECIES:			2502		2502		2502		2502	
SPECIMEN			7		8		9		10	
FK LNG MM			29		41		43		44	
STOM FULL %			50		50		60		45	
BOLUS VOL MM**3			1.0		15.6		22.0		8.0	
DIG STATE			7		4		4		8	
PREY		NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	MEAN VOL %
UNSPECIFIED		ND	35.8	ND	44.7	ND	66.2	100	20.7	41.2
INVERTEBRATES										
PROTOZOA										
FORAMINIFERA SPP	ADULTS			1	.1	1	.3			.1
NEMATODA										
PARASITIC SPP	ADULTS	4	4.7							.5
POLYCHAETA										
POLYCHAETA SPP	ADULTS			4	4.1	2	.4			2.3
AMPHARETIDAE SPP	ADULTS			6	40.6					7.3
OLIGOCHAETA										
OLIGOCHAETA SPP	ADULTS					12	18.1			1.8
GASTROPODA										
GASTROPODA SPP	ADULTS					3	2.6			.3
ARTHROPODA										
ARTHROPODA SPP	JUVENILES									.0
ACARINA										
ACARINA SPP	ADULTS	2	2.0							.2
OSTRACODA										
OSTRACODA SPP	ADULTS									.1
COPEPODA										
CALANOIDA SPP	ADULTS							2	.6	.2
HARPACTICOIDA SPP	ADULTS	62	48.8	28	2.4	5	.4	410	71.7	19.7
CIRRIPEDIA										
CIRRIPEDIA SPP	LARVAE					2	.4	1	.6	1.1
CUMACEA										
CUMACEA SPP	ADULTS							1	1.6	.2
HEMILEUCON SPP	ADULTS									.4
TANAIDACEA										
TANAIDACEA SPP	ADULTS			3	1.6					4.6
AMPHIPODA										
AMPHIPODA SPP	JUVENILES							1	.6	.3
COROPHIUM SPP	ADULTS			1	4.1	1	1.8			7.1
ANISOGAMMARUS CONFERVICOLU	ADULTS									.5
AMPITHOE SPP	ADULTS									3.2
INSECTA										
INSECTA SPP	ADULTS							ND	3.2	.3
HOMOPTERA										
CICADELLIDAE SPP	ADULTS					1	4.8			.4
APHIDIDAE SPP	ADULTS			1	2.8					.3
DIPTERA										
DIPTERA SPP	PUPAE									.1
MUSCIDAE SPP	LARVAE									2.4
DOLICHOPODIDAE SPP	LARVAE									1.0
CERATOPOGONIDAE SPP	LARVAE									.1
CHIRONOMIDAE SPP	LARVAE	3	17.5	1	.4					2.0
TIPULIDAE SPP	LARVAE									.3
MYCETOPHILIDAE SPP	LARVAE					3	6.6			.7
HYMENOPTERA										
HYMENOPTERA SPP	ADULTS							1	1.0	.2

Table F-16. (Reference Table E-18)

AREA: SEDGE
SAMPLER: LS
SITE: 18
SAMPLE: 1

SPECIES		2201		2201		2201		2201		2201		2201	
SPECIMEN		1		2		3		4		5		6	
FK LNG MM		129		108		85		118		76		75	
STOM FULL %		5		0		0		0		80		70	
BOLUS VOL MM**3		15.6		0		0		0		173.0		148.9	
DIG STATE		1		0		0		0		3		3	
PREY		NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %
UNSPECIFIED		ND	100.0							ND	57.7	ND	52.1
INVERTEBRATES													
PROTOZOA													
FORAMINIFERA SPP	ADULTS												
NEMATODA													
NEMATODA SPP	ADULTS												
POLYCHAETA													
AMPHARETIDAE SPP	ADULTS											20	37.2
OLIGOCHAETA													
OLIGOCHAETA SPP	ADULTS												
GASTROPODA													
ALDERIA SPP	ADULTS												
ARANEAE													
ARANEAE SPP	ADULTS												
OSTRACODA													
OSTRACODA SPP	ADULTS											3	.1
COPEPODA													
CYCLOPOIDA SPP	ADULTS												
HARPACTICOIDA SPP	ADULTS											1	.1
CUMACEA													
HEMILEUCON SPP	ADULTS									1	1.9	11	1.7
ISOPODA													
GNORIMOSPHAEROMA LUTEA	ADULTS												
IDOTEIDAE SPP	ADULTS												
AMPHIPODA													
AMPHIPODA SPP	ADULTS									1	1.9		
COROPHIUM SPP	JUVENILES												
COROPHIUM SPP	ADULTS									21	38.5	5	1.1
ANISOGAMMARUS CONFERVICOLU	ADULTS											4	6.3
DECAPODA													
CRANGON NIGRICAUDA	ADULTS												
BRACHYURA SPP	MEGALOPS											1	1.4
INSECTA													
INSECTA SPP	ADULTS												
INSECTA SPP	LARVAE												
HOMOPTERA													
APHIDIDAE SPP	ADULTS												
DIPTERA													
DIPTERA SPP	LARVAE												
CERATOPOGONIDAE SPP	LARVAE												
FISH													
EMBIOTOCIDAE													
SHINER SURFPERCH UNSPECIFIED													

Table F-16. (Continued)

AREA: SEDGE
SAMPLER: LS
SITE: 18
SAMPLE: 1

SPECIES:				2201		2201		2201		2201		1601		1601		
SPECIMEN				7		8		9		10		11		12		
FK LNG MM				68		62		78		57		173		147		
STOM FULL %				58		58		10		80		60		8		
BOLUS VOL MM**3				48.8		54.9		4.9		85.2		6750.0		0		
DIG STATE				4		3		3		4		9		0		
PREY			NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %		
UNSPECIFIED			ND	87.8	ND	43.6	ND	68.8	ND	23.5	ND	2.8				
INVERTEBRATES																
PROTOZOA																
FORAMINIFERA SPP	ADULTS		1	.1												
NEMATODA																
NEMATODA SPP	ADULTS															
POLYCHAETA																
AMPHARETIDAE SPP	ADULTS						1	15.2								
OLIGOCHAETA																
OLIGOCHAETA SPP	ADULTS															
GASTROPODA																
ALGERIA SPP	ADULTS								15	57.2						
ARANEAE																
ARANEAE SPP	ADULTS															
OSTRACODA																
OSTRACODA SPP	ADULTS		1	.2	1	.1	1	.7								
COPEPODA																
CYCLOPOIDA SPP	ADULTS															
HARPACTICOIDA SPP	ADULTS		1	.1	1	.1	3	2.3								
CUMACEA																
MEMILEUCON SPP	ADULTS		2	.9			1	2.7								
ISOPODA																
GNORIMOSPHAEROMA LUTEA	ADULTS															
IDOTEIDAE SPP	ADULTS															
AMPHIPODA																
AMPHIPODA SPP	ADULTS								ND	7.8						
COROPHIUM SPP	JUVENILES						5	9.1								
COROPHIUM SPP	ADULTS		18	18.2	ND	56.1			7	12.3						
ANISOGAMMARUS CONFERVICOLU	ADULTS						2	9.2								
DECAPODA																
CRANGON NIGRICAUDA	ADULTS															
BRACHYURA SPP	MEGALOPS															
INSECTA																
INSECTA SPP	ADULTS															
INSECTA SPP	LARVAE															
HOMOPTERA																
APHIDIDAE SPP	ADULTS															
DIPTERA																
DIPTERA SPP	LARVAE															
CERATOPOGONIDAE SPP	LARVAE		1	1.5												
FISH																
EMBIOTOCIDAE																
SHINER SURFPERCH UNSPECIFIED											1	98.0				

Table F-16. (Continued)

AREA: SEDGE
SAMPLER: LS
SITE: 10
SAMPLE: 1

SPECIES:		1601		1601		3401		4402		4402		4402	
SPECIMEN		13		14		15		16		17		18	
FK LNG MM		115		101		164		105		99		100	
STOM FULL %		50		8		10		75		80		75	
BOLUS VOL MM**3		621.9		1.0		27.0		792.0		639.0		722.0	
DIG STATE		3		1		1		5		5		6	
PREY		NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %
UNSPECIFIED		ND	95.0	ND	100.0	ND	100.0	ND	95.3	ND	80.2	ND	3.0
INVERTEBRATES													
PROTOZOA													
FORAMINIFERA SPP	ADULTS												
NEMATODA													
NEMATODA SPP	ADULTS												
POLYCHAETA													
AMPHARETIDAE SPP	ADULTS												
OLIGOCHAETA													
OLIGOCHAETA SPP	ADULTS												
GASTROPODA													
ALDERIA SPP	ADULTS												
ARANEAE													
ARANEAE SPP	ADULTS									3	.6		
OSTRACODA													
OSTRACODA SPP	ADULTS												
COPEPODA													
CYCLOPOIDA SPP	ADULTS												
HARPACTICOIDA SPP	ADULTS												
CUMACEA													
HEMILEUCON SPP	ADULTS												
ISOPODA													
GNORIMOSPHAEROMA LUTEA	ADULTS							1	1.4				
IDOTEIDAE SPP	ADULTS							2	.7				
AMPHIPODA													
AMPHIPODA SPP	ADULTS							ND	.3	1	.8	ND	10.0
COROPHIUM SPP	JUVENILES												
COROPHIUM SPP	ADULTS	2	3.0							8	5.6	2	2.0
ANISOGAMMARUS CONFERVICOLU	ADULTS	2	2.0					1	1.2	1	.2	67	85.0
DECAPODA													
CRANGON NIGRICAUDA	ADULTS							1	.5				
BRACHYURA SPP	MEGALOPS												
INSECTA													
INSECTA SPP	ADULTS									ND	10.1		
INSECTA SPP	LARVAE							ND	.1				
HOMOPTERA													
APHIDIDAE SPP	ADULTS							2	.5	1	.2		
DIPTERA													
DIPTERA SPP	LARVAE									2	2.3		
CERATOPOGONIDAE SPP	LARVAE												
FISH													
EMBIOTOCIDAE													
SHINER SURFPERCH UNSPECIFIED													

Table F-16. (Continued)

AREA: SEOWE
SAMPLER: LS
SITE: 18
SAMPLE: 1

SPECIES		4482		4482		4482		4081		3981		3981		
SPECIMEN		19		28		21		22		23		24		
FK LNG MM		188		96		88		125		107		80		
STOM FULL %		58		58		65		25		60		75		
BOLUS VOL MM**3		343.8		274.6		185.9		64.8		48.0		18.9		
DIG STATE		6		4		5		6		6		7		
PREY		NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	MEAN VOL %
UNSPECIFIED		ND	48.8	ND	94.8	ND	45.2	ND	39.3	ND	32.9	ND	15.8	58.4
INVERTEBRATES														
PROTOZOA														
FORAMINIFERA SPP	ADULTS													.8
NEMATODA														
NEMATODA SPP	ADULTS						2.8							.1
POLYCHAETA														
AMPHARETIDAE SPP	ADULTS							6	53.5					5.3
OLIGOCHAETA														
OLIGOCHAETA SPP	ADULTS							5	1.8					.1
GASTROPODA														
ALDERIA SPP	ADULTS													2.9
ARANEAE														
ARANEAE SPP	ADULTS													.8
OSTRACODA														
OSTRACODA SPP	ADULTS									1	.1			.1
COPEPODA														
CYCLOPOIDA SPP	ADULTS	1	1.8											.1
HARPACTICOIDA SPP	ADULTS													.1
CUMACEA														
MEMILEUCON SPP	ADULTS													.4
ISOPODA														
SPHORIMOSPHAEROMA LUTEA	ADULTS													.1
IDOTEIDAE SPP	ADULTS													.8
AMPHIPODA														
AMPHIPODA SPP	ADULTS	ND	18.8											1.9
CORUPHIUM SPP	JUVENILES													.5
CORUPHIUM SPP	ADULTS	1	1.8			3	7.5	3	5.4			2	18.6	7.7
ANISOGAMMARUS CONFERVICOLU	ADULTS	19	48.8	ND	5.5	15	45.2			14	67.8	9	73.6	16.8
DECAPODA														
CRANGON NIGRICAUDA	ADULTS													.8
BRACHYURA SPP	MEGALOPS													.1
INSECTA														
INSECTA SPP	ADULTS													.5
INSECTA SPP	LARVAE			1	.8									.8
MONOPTERA														
APHIDIDAE SPP	ADULTS													.8
DIPTERA														
DIPTERA SPP	LARVAE													.1
CERATOPOGONIDAE SPP	LARVAE													.1
FISH														
EMBIOTOCIDAE														
SHINER SURFPERCH UNSPECIFIED														4.9

Table F-16. (Concluded)

AREA: SEDGE
SAMPLER: LS
SITE: 18
SAMPLE: 1

SPECIES:		2481	2201	2281	2281	2281	2281
SPECIMEN		1	2	3	4	5	6
FK LNG MM		79	127	188	87	129	119
STOM FULL %		65	5	10	35	0	10
BOLUS VOL MM**3		13.0	6.0	27.0	42.0	0	35.0
DIG STATE		5	1	1	3	0	3

PREY		NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %
UNSPECIFIED		ND	31.0	ND	100.0	ND	100.0	ND	76.3			ND	79.3
INVERTEBRATES													
POLYCHAETA													
POLYCHAETA SPP	ADULTS							ND	14.3			1	4.8
OSTRACODA													
OSTRACODA SPP	ADULTS											1	.3
COPEPODA													
HARPACTICOIDA SPP	ADULTS							1	.2				
CIRRIPEDIA													
CIRRIPEDIA SPP	LARVAE							3	.4				
MYSIDACEA													
MYSIDACEA SPP	ADULTS	1	1.5										
CUMACEA													
HEMILEUCON SPP	ADULTS	3	8.9									1	.9
AMPHIPODA													
COROPHIUM SPP	ADULTS	11	49.6					9	8.8			9	15.5
ANISOGAMMARUS CONFERVICOLU	ADULTS	2	3.5										
DIPTERA													
PSYCHODIDAE SPP	LARVAE	1	1.8										

SPECIES:		2281	2201		
SPECIMEN		7	8		
FK LNG MM		112	98		
STOM FULL %		10	10		
BOLUS VOL MM**3		64.0	64.0		
DIG STATE		3	3		

PREY		NUMB	VOL %	NUMB	VOL %	MEAN VOL %
UNSPECIFIED		ND	63.8	ND	73.6	75.0
INVERTEBRATES						
POLYCHAETA						
POLYCHAETA SPP	ADULTS	1	5.8	2	6.2	4.6
OSTRACODA						
OSTRACODA SPP	ADULTS					.8
COPEPODA						
HARPACTICOIDA SPP	ADULTS			1	.1	.8
CIRRIPEDIA						
CIRRIPEDIA SPP	LARVAE					.1
MYSIDACEA						
MYSIDACEA SPP	ADULTS					.5
CUMACEA						
HEMILEUCON SPP	ADULTS			4	1.8	1.7
AMPHIPODA						
COROPHIUM SPP	ADULTS	18	38.2	23	16.3	17.2
ANISOGAMMARUS CONFERVICOLU	ADULTS					.5
DIPTERA						
PSYCHODIDAE SPP	LARVAE					.3

Table F-17. (Reference to Table E-22)

SPECIES#		4002	4002	4002	4002	4002	1601		
SPECIMEN	AREA# L SAND	1	2	3	4	5	6		
FX LNG MM	SAMPLE# MS	35	55	46	46	33	52		
STOM FULL %	SITE# 1	50	40	53	43	50	68		
BOLUS VOL MM**3	SAMPLE# 2	7.2	59.3	15.6	19.7	4.9	148.9		
DIG STATE		8	7	5	5	7	6		
PREY		NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	MEAN VOL %
UNSPECIFIED		ND	8.6	ND	26.2	ND	8.6	ND	20.8	ND	10.4	ND	35.8	24.6
INVERTEBRATES														
NEMERTEA														
NEMERTEA SPP	ADULTS			6	9.3									.8
NEMATODA														
PARASITIC SPP	ADULTS									1	.4			.0
POLYCHAETA														
POLYCHAETA SPP	ADULTS			23	5.5	ND	51.7	4	6.8					5.7
POLYCHAETA SPP	JUVENILES	4	6.9											.4
ETEONE SPP	ADULTS	1	32.5											3.0
PSEUDOPOLYDORA SPP	ADULTS			2	10.3					4	6.4			1.5
OLIGOCHAETA														
OLIGOCHAETA SPP	ADULTS	3	1.6			5	3.5	5	2.5	2	.8			.8
OSTRACODA														
OSTRACODA SPP	ADULTS													.1
COPEPODA														
CYCLOPOIDA SPP	ADULTS											3	.5	.0
HARPACTICOIDA SPP	ADULTS	3	.6	2	.1	2	.4	7	2.5	98	36.0			3.7
TANAIDACEA														
TANAIDACEA SPP	ADULTS	118	52.8	76	48.6	14	35.8	18	65.8	11	36.8	317	61.8	53.6
ISOPODA														
IDOTEIDAE SPP	ADULTS											2	.4	.4
AMPHIPODA														
AMPHIPODA SPP	ADULTS											1	.2	3.2
AMPHIPODA SPP	JUVENILES							2	4.8	1	10.4	7	2.0	1.8
CORDPHIUM SPP	ADULTS											2	.7	.5
CAPRELLIDAE SPP	ADULTS													.1

SPECIES#		1601	1601	1601	1601	1601			
SPECIMEN		7	8	9	10	11			
FX LNG MM		53	45	55	60	51			
STOM FULL %		75	75	25	50	80			
BOLUS VOL MM**3		148.9	54.8	13.8	39.3	91.1			
DIG STATE		6	7	5	6	7			
PREY		NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %		
UNSPECIFIED		ND	17.1	ND	24.3	ND	59.7	ND	34.7	ND	24.4		
INVERTEBRATES													
NEMERTEA													
NEMERTEA SPP	ADULTS												
NEMATODA													
PARASITIC SPP	ADULTS												
POLYCHAETA													
POLYCHAETA SPP	ADULTS												
POLYCHAETA SPP	JUVENILES												
ETEONE SPP	ADULTS												
PSEUDOPOLYDORA SPP	ADULTS												
OLIGOCHAETA													
OLIGOCHAETA SPP	ADULTS												
OSTRACODA													
OSTRACODA SPP	ADULTS												
COPEPODA													
CYCLOPOIDA SPP	ADULTS												
HARPACTICOIDA SPP	ADULTS												
TANAIDACEA													
TANAIDACEA SPP	ADULTS												
ISOPODA													
IDOTEIDAE SPP	ADULTS												
AMPHIPODA													
AMPHIPODA SPP	ADULTS												
AMPHIPODA SPP	JUVENILES												
CORDPHIUM SPP	ADULTS												
CAPRELLIDAE SPP	ADULTS												

Table F-18. (Reference Table E-25)

AREA# N TRWL
SAMPLER# OT
SITE# 3
SAMPLE# 1

SPECIES#		5401		2902		4002		2901		1601		2901	
SPECIMEN		1		2		3		4		5		6	
FK LNG MM		248		73		93		88		100		81	
STOM FULL %		8		95		8		90		0		85	
BOLUS VOL MM**3		2.5		13.1		8		9.8		0		33.6	
DIG STATE		1		5		8		4		0		6	
PREY		NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %
UNSPECIFIED		ND	5.8	ND	16.8			ND	1.8			ND	3.8
INVERTEBRATES													
POLYCHAETA													
AMPHARETIDAE SPP	ADULTS											1	97.0
OSTRACODA													
OSTRACODA SPP	ADULTS												
COPEPODA													
CALANOIDA SPP	ADULTS			1	1.8								
HARPACTICOIDA SPP	ADULTS												
CUMACEA													
CUMELLA SPP	ADULTS												
AMPHIPODA													
AMPHIPODA SPP	ADULTS			4	4.8								
COROPHIUM SPP	ADULTS			4	3.8								
AMPITHOE SPP	ADULTS												
CAPRELLIDAE SPP	ADULTS			73	53.8								
DECAPODA													
DECAPODA SPP	LARVAE			1	23.8								
CRANGON FRANCISCORUM	ADULTS												
PANDALUS DANAE	ADULTS	1	95.8										
FISH													
UNIDENTIFIED	UNSPECIFIED							1	99.8				

SPECIES#		1602		5301		2901		1601		901		3901		
SPECIMEN		7		8		9		10		11		12		
FK LNG MM		82		75		89		86		86		78		
STOM FULL %		0		20		45		34		84		5		
BOLUS VOL MM**3		0		.1		4.2		2.2		9.5		.1		
DIG STATE		0		7		2		1		4		8		
PREY		NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	MEAN VOL %
UNSPECIFIED				ND	23.8	ND	3.8	ND	100.0	ND	29.0	ND	2.8	20.2
INVERTEBRATES														
POLYCHAETA														
AMPHARETIDAE SPP	ADULTS													10.8
OSTRACODA														
OSTRACODA SPP	ADULTS			3	5.8	5	2.0					1	25.0	3.6
COPEPODA														
CALANOIDA SPP	ADULTS			5	2.0									.3
HARPACTICOIDA SPP	ADULTS			126	66.8									7.6
CUMACEA														
CUMELLA SPP	ADULTS			2	2.8									.2
AMPHIPODA														
AMPHIPODA SPP	ADULTS													.4
COROPHIUM SPP	ADULTS													.3
AMPITHOE SPP	ADULTS											2	73.8	8.1
CAPRELLIDAE SPP	ADULTS									1	1.0			6.8
DECAPODA														
DECAPODA SPP	LARVAE													2.6
CRANGON FRANCISCORUM	ADULTS									3	70.8			7.8
PANDALUS DANAE	ADULTS													10.6
FISH														
UNIDENTIFIED	UNSPECIFIED					1	95.8							21.6

Table F-19. (Reference Table E-25)

AREA: N TRWL
SAMPLER: OT
SITE: 1
SAMPLE: 1

SPECIES:																						
SPECIES:			4003		2901		1601		4002		2901		4002		1601		3901		2502		1601	
SPECIMEN			1		2		3		4		5		6		7		8		9		10	
FK LNG MM			161		119		108		87		95		78		85		92		57		77	
STOM FULL %			92		92		0		55		88		88		98		65		58		0	
BOLUS VOL MM**3			13.9		21.6		0		3.0		13.2		7.3		47.5		2.2		4.5		0	
DIG STATE			9		6		0		5		5		6		7		6		7		0	
PREY		NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	MEAN VOL %
UNSPECIFIED				ND	25.0			ND	6.0	ND	2.7	ND	.5	ND	95.5	ND	2.0	ND	24.0			19.6
INVERTEBRATES																						
UNSPECIFIED SPP	ADULTS																	16	7.0			.9
ARANEAE																						
ARANEAE SPP	ADULTS																	2	4.0			.5
OSTRACODA																						
OSTRACODA SPP	ADULTS																	1	1.0			.1
COPEPODA																						
CALANOIDA SPP	ADULTS																	162	11.0			1.4
HARPACTICOIDA SPP	ADULTS									16	.2							313	27.0			3.4
CUMACEA																						
CUMELLA SPP	ADULTS							1	.2									1	1.0			.2
TANAIDACEA																						
TANAIDACEA SPP	ADULTS																	7	4.0			.5
ISOPODA																						
IDOTEIDAE SPP	ADULTS															3	14.0	2	2.0			2.0
AMPHIPODA																						
AMPHIPODA SPP	ADULTS							43	83.0													10.4
COROPHIUM SPP	ADULTS							9	10.0									2	1.0			1.4
ANISOGAMMARUS CONFERVICOLU	ADULTS									1	.1											.0
AMPITHOE SPP	ADULTS																	1	2.0			.3
CAPRELLIDAE SPP	ADULTS															39	84.0					10.5
DECAPODA																						
DECAPODA SPP	LARVAE																	8	13.0			1.6
CRANGON FRANCISCORUM	ADULTS	1	100.0	3	75.0									2	94.0							33.6
CRANGON NIGRICAUDA	ADULTS																	1	6.0			.0
CRANGON SPP	ADULTS													2	.5							.1
DIPTERA																						
DIPTERA SPP	ADULTS																	1	4.0			.5
PSYCHODIDAE SPP	ADULTS																	2	3.0			.4
FISH																						
UNIDENTIFIED	LARVAE												99.5									12.4
PLEURONECTIDAE																						
ENGLISH SOLE	LARVAE									2	97.0											12.1

Table F-20. (Reference Table E-26)

AREA: S TRWL
SAMPLER: DT
SITE: 12
SAMPLE: 1

SPECIES:			4801		1601		2201		1601		4801		4801
SPECIMEN			1		2		3		4		5		6
FK LNG MM			193		107		79		174		135		144
STOM FULL %			80		88		80		15		83		76
BOLUS VOL MM**3			13.7		21.6		1.6		28.5		72.9		16.9
DIG STATE			5		3		1		2		3		3
PREY		NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %
UNSPECIFIED		ND	11.3	ND	65.5	ND	99.5	ND	99.8	ND	82.8	ND	88.5
INVERTEBRATES													
NEMATODA													
NEMATODA SPP	ADULTS												
POLYCHAETA													
CAPITELLIDAE SPP	ADULTS											1	.5
AMPHARETIDAE SPP	ADULTS									5	2.8	1	1.8
POLYDORA SPP	ADULTS											6	8.8
BIVALVIA													
BIVALVIA SPP	ADULTS	2	88.8										
OSTRACODA													
OSTRACODA SPP	ADULTS					1	.5						
MYSIDACEA													
MYSIDACEA SPP	ADULTS			1	.5								
AMPHIPODA													
COROPHIUM SPP	ADULTS	1	1.8	16	30.8					35	16.8	5	2.8
ANISOGAMMARUS CONFERVICOLU	ADULTS							1	1.8				
DECAPODA													
DECAPODA SPP	LARVAE			2	24.8								
INSECTA													
INSECTA SPP	LARVAE	1	.7										

SPECIES:		1601		1601		4801		4801	
SPECIMEN		7		8		9		10	
FK LNG MM		125		112		322		367	
STOM FULL %		95		93		8		15	
BOLUS VOL MM**3		125.8		24.8		0		56.8	
DIG STATE		1		2		0		1	
PREY		NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	MEAN VOL %
UNSPECIFIED		ND	100.0	ND	97.5			ND	2.8	69.4
INVERTEBRATES										
NEMATODA										
NEMATODA SPP	ADULTS			2	.5					.1
POLYCHAETA										
CAPITELLIDAE SPP	ADULTS									.1
AMPHARETIDAE SPP	ADULTS									.3
POLYDORA SPP	ADULTS									.9
BIVALVIA										
BIVALVIA SPP	ADULTS							2	98.8	28.7
OSTRACODA										
OSTRACODA SPP	ADULTS									.1
MYSIDACEA										
MYSIDACEA SPP	ADULTS									.1
AMPHIPODA										
COROPHIUM SPP	ADULTS			4	2.8					5.7
ANISOGAMMARUS CONFERVICOLU	ADULTS									.1
DECAPODA										
DECAPODA SPP	LARVAE									2.7
INSECTA										
INSECTA SPP	LARVAE									.1

Table F-21. (Reference Table E-26)

AREA: S TRWL
SAMPLER: OT
SITE: 15
SAMPLE: 1

SPECIES:			1501		4001		1601		4001		4001		1601
SPECIMEN			1		2		3		4		5		6
FK LNG MM			128		119		97		126		124		72
STDM FULL %			98		60		70		65		58		82
BOLUS VOL MM**3			55.8		28.5		13.3		7.2		38.0		17.6
DIG STATE			6		8		5		7		8		6
PREY		NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %
UNSPECIFIED		ND	33.5	ND	11.5	ND	24.8	ND	7.8	ND	8.8	ND	1.8
INVERTEBRATES													
POLYCHAETA													
CAPITELLIDAE SPP	ADULTS							1	3.8				
GLYCERA SPP	ADULTS			31	88.8			22	86.8	25	98.8		
BIVALVIA													
BIVALVIA SPP	ADULTS							1	1.8	1	2.8		
CUMACEA													
CUMELLA SPP	ADULTS												
ISOPODA													
ISOPODA SPP	ADULTS	1	3.8										
AMPHIPODA													
COROPHIUM SPP	ADULTS	1	1.8	1	.5			1	1.8				
GAMMARIDEA SPP	ADULTS	1	.5										
ANISOGAMMARUS CONFERVICOLU	ADULTS					12	74.8					1	4.8
TALITRIDAE SPP	ADULTS	1	2.8			1	2.8						
DECAPODA													
CRANGON FRANCISCORUM	ADULTS	1	55.8									1	95.8

SPECIES:		4001		4001		4001		4001	
SPECIMEN		7		8		9		10	
FK LNG MM		122		122		69		65	
STDM FULL %		95		87		77		78	
BOLUS VOL MM**3		45.5		24.5		11.2		9.7	
DIG STATE		7		8		7		7	
PREY	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	NUMB	VOL %	MEAN VOL %
UNSPECIFIED	ND	5.8	ND	17.8	ND	21.8	ND	1.2	13.4
INVERTEBRATES									
POLYCHAETA									
CAPITELLIDAE SPP	ADULTS								.3
GLYCERA SPP	ADULTS	21	77.8	19	80.8	8	75.8		49.6
BIVALVIA									
BIVALVIA SPP	ADULTS	ND	13.8	3	2.8				2.3
CUMACEA									
CUMELLA SPP	ADULTS					1	1.8	2	.8	.2
ISOPODA									
ISOPODA SPP	ADULTS								.3
AMPHIPODA									
COROPHIUM SPP	ADULTS			1	1.8	4	3.8	135	98.8	18.4
GAMMARIDEA SPP	ADULTS									.1
ANISOGAMMARUS CONFERVICOLU	ADULTS									7.8
TALITRIDAE SPP	ADULTS									.4
DECAPODA									
CRANGON FRANCISCORUM	ADULTS									15.8

Higley, Duane L.
A study of the invertebrates and fishes of salt marshes in two Oregon estuaries / by Duane L. Higley and Robert L. Holton.--Fort Belvoir, Va. : U.S. Army, Corps of Engineers, Coastal Engineering Research Center ; (Springfield, Va. : available from NTIS), 1981.
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